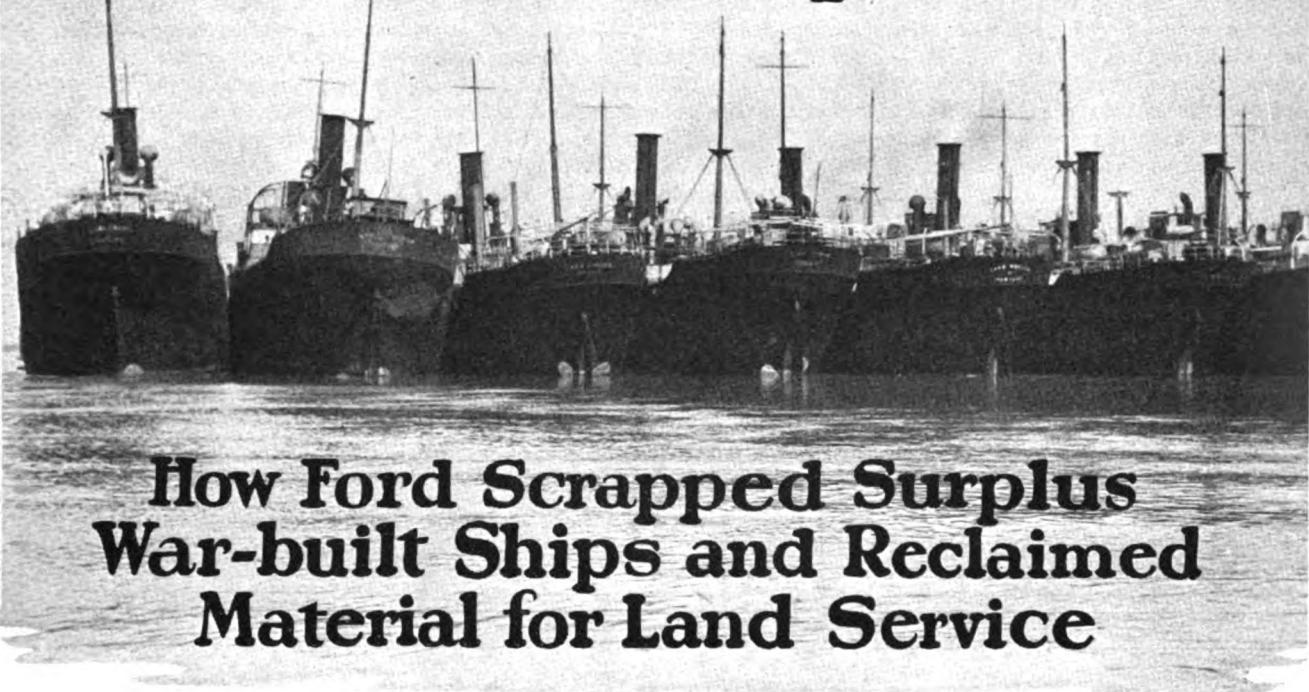


A Cycle in Transportation



How Ford Scrapped Surplus War-built Ships and Reclaimed Material for Land Service

AMBITION to conquer new industrial worlds has ever been characteristic of the Ford Motor Co., Detroit, but this instinct of the pioneer received unexpected and unparalleled impetus in 1925 when the company purchased 199 surplus war-built steamers from the United States shipping board and undertook to reincarnate their metal and machinery in land service.

In America ship scrapping was a sporadic art; in Europe it was little better organized. A reckless hacking-out of such metal and equipment as could readily be attacked, and abandonment of the jagged hulk. Never before had so many as ten score upstanding steel ships been assembled, and their wrecking organized on a methodical, progressive basis whose primary motive was the salvaging of every usable bit of material and equip-

ment down to mites of wood only 2 x 6 inches in size.

No story of the war is more dramatic than this venture. How the larger of these marine orphans of the war emergency were dismantled at eastern shipyards, their vitals stowed away in the partially-reconditioned smaller lake-type ships, the whole towed through the treacherous waters of the North Atlantic and pinched through the narrow canals of the St. Lawrence route, the dissembling at the docks at Fordson and the manifold uses to which the equipment and scrap metal have been put, is a narrative of compelling interest. It is at once a text on ship scrapping and an epic of human achievement.

Herewith the MARINE REVIEW begins publication of the history of this exploit, which has been divided into five installments.

199 Ships Are Bought: Salvage Plans Laid

FORD MOTOR CO. on Aug. 18, 1925, undertook a unique task, the salvage of a merchant armada.

Lying idle at a dozen scattered moorages throughout the country were hundreds of war-built ships—ships which had been constructed with steel of exceptional quality and equipped with machinery of high grade, yet ships which, for a complexity of reasons, would never again put to sea under their own power.

These ships were deteriorating rapidly. Idleness was taking heavy toll. Corrosion was eating away good metal. Exposure was destroying good

equipment. Each year that passed saw further inroads of decay; many of the vessels had not moved for half a decade or more.

Swinging idly at their chains the ships exemplified titanic waste. Into their building had been poured uncomputed hours of human labor and thought. Into them had been put honest workmanship and honest materials. The vessels had been built on a vast scale, the greatest in the history of the world. Their deterioration was commensurate. In their disuse they represented that most sinister of all wastes: the waste of human effort.

The job which the Ford Motor Co. undertook was partially to end this waste. It offered to reconstruct 199 of the ships into the basic materials from which they had been made, and to put these materials once more into active use. The materials had been destined originally for transportation. Through the nature of the company's activities, the reconversion would return them to that sphere, though on land rather than on sea.

The Ford Motor Co.'s offer was made in response to a request from the United States shipping board, which had charge of the vessels. In conjunction with other firms the com-

pany entered a bid for 200 of the ships (the number was later reduced by one) and, as its bid was highest, a contract of sale was executed. The agreement stipulated that the ships should be so dismantled that they could not be used in navigation. The company was allowed to utilize the dismantled portions of the vessels—engines, boilers, auxiliary machinery, equipment and ship sections—in its own plants, branches and subsidiaries; but any parts disposed of otherwise must be rendered into scrap. The policy adopted by the company was to use everything within its own factories.

Fifty of the 199 vessels were of the submarine type, so-called because built by the Submarine Boat Corp. at Newark, N. J. They were 324 feet in length, with a beam of 46 feet and a

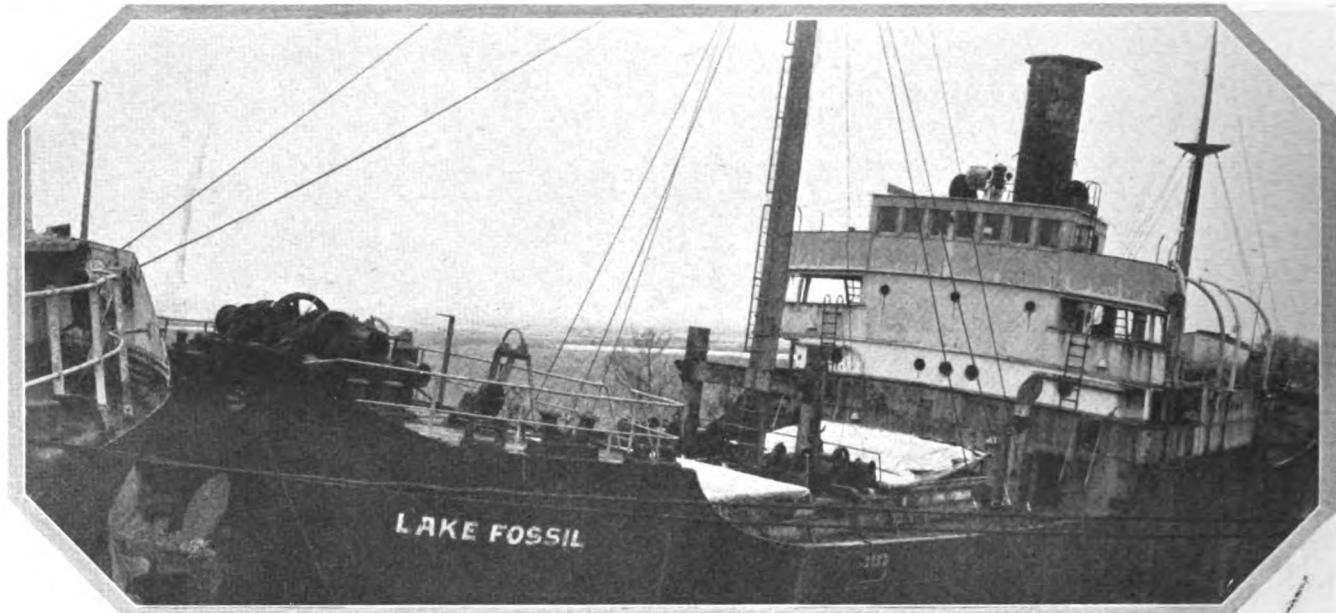
had been completed by the armistice.

For various reasons, American shipping collapsed after the war and gradually the war-built ships were withdrawn from service and put into ordinary. In April, 1924, the government ships tied up at various ports were culled and the policy of offering 200 of the surplus for scrapping was adopted. The first series of bids was rejected. The second call elicited the Ford Motor Co.'s proffer of \$1,706,000 for the 200. Later one of the lake-type ships was sold by the shipping board and the price for the remaining 199 stipulated as \$1,697,470. For the additional sum of \$51,470 for each of the submarine type and \$16,470 for each of the lake type the company could use or dispose of the vessels within prescribed limits. Under this clause three of the lake type

pipe as pipe, "clean" steel was to be saved wherever possible and used without remelting.

All this required careful planning. Many materials go into the construction of a ship: Steel, brass, cork, wood, tin, asbestos, magnesium, rubber, felt, canvas, hemp, oakum, paper. Articles of a wide variety are included in the fittings: Thermometers, engines, ice machines, valves, boilers, wash bowls, anchor chains, winches, pumps, chairs, hardware, radiators, lockers, motors, desks, bells, lamps, ranges, tanks, pulleys, injectors, ejectors, cables, windows, windlasses . . . to list but a few. These materials and articles must be reclaimed separately. Ingenuity must be drawn upon to find new uses for them.

The difficulties of the undertaking were fully realized. The immensity



Typical Warbuilt Steamer of the Lake Type, Nosed into the Stern of a Sister Ship along the Banks near Orange, Tex.

deadweight of 5060 tons. The remainder, built at various shipyards on the Great Lakes—American Ship Building Co., Great Lakes Engineering Works, Detroit Shipbuilding Co., Manitowoc Shipbuilding Co., Saginaw Shipbuilding Co. and Toledo Shipbuilding Co.—were known as lake-type boats, or lakers. They were 251 to 253½ feet in length, with beam of 43½ feet and deadweight ranging from 3280 to 4155 tons.

Some of the 199 ships had done duty as part of the memorable "bridge to France" during the war. Sixty per cent had not been completed until after the war. All were built in response to the war call for shipping, which resulted in the creation of the Emergency Fleet corporation by the shipping board. The original program included the construction of 3270 ships, of which less than one-sixth

were reconditioned as steamers and seven made into barges.

Ship salvage of the kind undertaken by the Ford Motor Co. was entirely new. A few ships had been torn apart in this country, notably obsolete and treaty-condemned war vessels, and in Europe shipbreaking was a recognized industry. But the present venture was comparable to neither. In the first place it was by far the largest dismantling operation ever attempted. Secondly the operation was not to be what was commonly known as "scrapping." The ships were not to be ripped apart haphazardly to get what could readily be removed and throw away what could not. Instead they were to be dismantled in such a manner that different units could be reclaimed as such and put to their original use, or a new use found for them. Gages were to be salvaged as gages,

of the task was such as to stagger veteran shipyard men. Where individual ships had been torn down before, a fleet was to be dismantled now. Machinery of a magnitude equal to the operation had to be devised and installed. The program had to be laid out so thoroughly that there would be no hitch, once the work started.

Experience and knowledge had to be gained at first hand. No men were available to tell how the job should be done, for no job like it had ever been done before. Outside aid was practically useless; experts were plentiful to tell why certain things could not be done, but there were few to tell how they could be done.

Shipbreaking in Great Britain was listed as one of the most hazardous occupations. This meant that extreme precautions must be taken to safe-

guard the workmen. A set of safety rules was drawn up which the men had to follow rigidly. Safety devices were originated for their protection.

New departments had to be established to handle the different phases of the dismantling work. Men had to be trained along new lines. Tests had to be made to determine the best methods of operation. Chemical analyses of the various metals were necessary. Special tools had to be made. Word was sent to the farthest outposts of the company that articles from the ships would be available and that uses must be found for them.

The boats were moored at scattered points along the Gulf of Mexico and the Atlantic coast from Orange, Tex., to Jones Point, N. Y. Their condition was such that they could not operate under their own power, yet they had

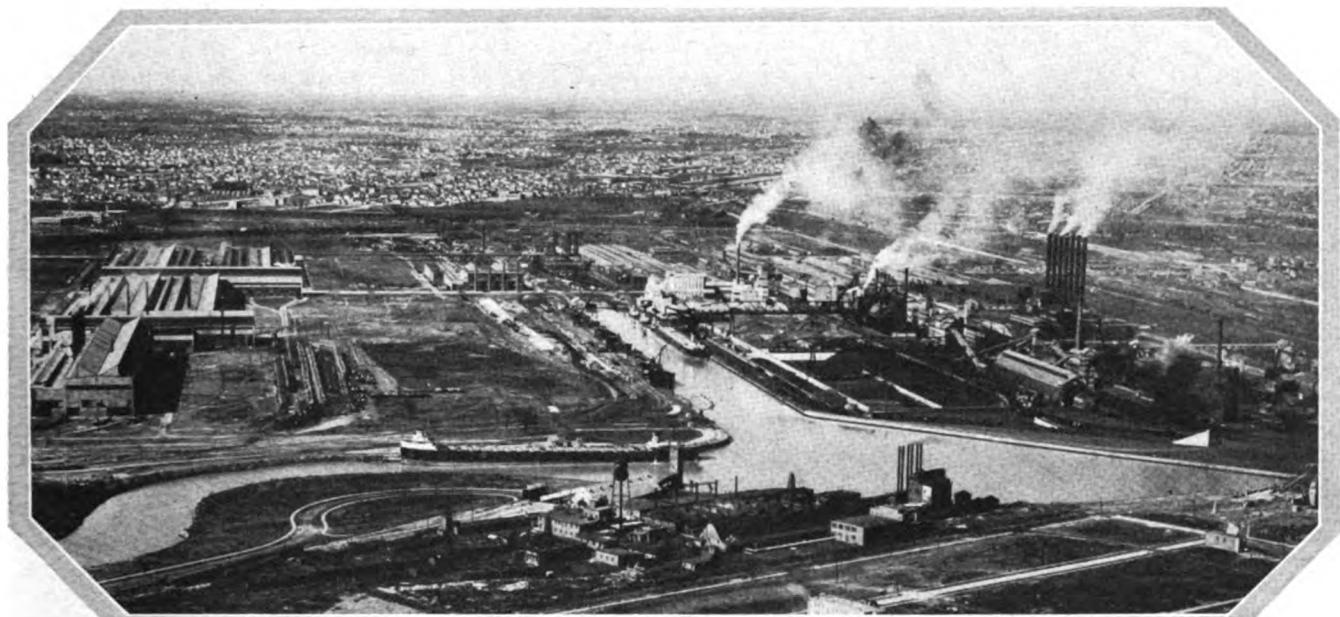
Lawrence and the St. Lawrence river and through a difficult series of canals to the Great Lakes and Detroit. This schedule of movement had to be followed with exact precision, for a break in it would mean a dearth of ships at Fordson and a cessation of work.

Getting the ships safely to their destination was one of the big problems of the job. Shipping men were frank in their opinion that it could not be done in the time required. The waters to be traversed were among the most treacherous of the American continent. Winter put an end to navigation in the Great Lakes and St. Lawrence region for a third of each year. The storms of the North Atlantic were sharp and frequent. Barges were considered the most difficult of all vessels to handle and,

be decided was where the ships were to be dismantled. Next, how to get them there.

The main plant of the company is at Fordson, adjoining Detroit on the west and linked to the Detroit river by the River Rouge. Ultimately the vessels would have to reach there, either intact or dismembered, for at Fordson were the great furnaces through which much of the steel was to be put. There also were the shops in which the engines and other machinery were to be reconditioned and the departments in which the various ship materials were to be reclaimed.

Fifty of the boats—those of the submarine type—were too large to pass through the Welland canal and the canals lining the St. Lawrence river; they, therefore, would have



Airplane View of Fordson, Mich., Works of Ford Motor Co. Ships Were Wrecked in the Slip in the Middle Distance across from the Ore Bridge.

to be made seaworthy and brought to the Fordson plant, near Detroit, where the salvaging was to take place. This meant towing. And, incidentally, the largest towing job ever attempted. Tugs had to be purchased, and three ships were reconditioned to serve as towing steamers.

The submarine-type ships were too large to enter the Great Lakes because of the limited size of the St. Lawrence river canals. Arrangements, therefore, had to be made for taking them apart on the Atlantic seaboard and loading them into the lakers. This meant an elaborate schedule of movement: the submarine vessels to be towed from their moorings to the shipyards; then the lakers to be towed to the shipyards to receive their quota of scrap cargo; and finally the lakers to proceed up the Atlantic coast to the Gulf of St.

except for the three reconditioned ships, all must be brought in as barges. The task was almost impossible—so the shipping men averred.

But the ships were brought through. The dismantling was carried out. Ship parts were reconditioned and put to uses never dreamed of before. New industrial practices and processes resulted. Men gained new experience and new knowledge.

There was little thought of profit when the job was undertaken. The fruit of men's labors was lying idle and wasting, it should be put once more to work—this was the motive back of the job. Life was given again to dead materials. That was sufficient.

When the Ford Motor Co. came into possession of the 199 ships none was in condition to put to sea under its own power. The first matter to

be taken apart on the eastern seaboard. The lakers presented a different problem.

Many plans were considered, and features of them adopted or rejected. One proposal was to reduce all vessels to charging box size on the Atlantic coast and ship them by rail to Detroit. This had obvious disadvantages and was early discarded.

Another was to cut the submarines into cargo size for the lake-type boats at eastern cities, load as many lakers as necessary with submarine scrap, send them to Fordson by way of the St. Lawrence river, and then send the empty lakers not needed via the Hudson river, the New York state barge canal and Lake Erie to Detroit. Under this plan the empty lakers would proceed to Troy, N. Y., where they would be cut by torch to a bridge clearance of 15



Getting Even the Small Lakers through the St. Lawrence Canals Was a Tight Squeeze

feet. This would strip them to a point 6 feet below the main deck, and the excess portions would be carried in the vessels' holds. The vessels would have to be towed one at a time across New York state, however, a slow and expensive operation. This plan too was abandoned.

The plan finally adopted was to have the submarine type ships cut apart at Norfolk, Va., Chester, Pa., and Kearny, N. J. From these points

the machinery and ship sections would be transported to Fordson as cargo in the lakers, and all lakers, light and loaded, would use the St. Lawrence river route.

The submarines were already handily located for the dismantling job. Nineteen of them were in the James river above Norfolk, 12 were in the Delaware river at Hog Island, the famous wartime shipyard, 16 were at Jones Point, N. Y., 36 miles up the Hudson river from Manhattan,

and 3 were at Staten Island in New York harbor. It was decided to have the work done by shipyards under Ford supervision. Branches of the Ford Motor Co. at Norfolk, Chester and Kearny would facilitate this phase.

Twenty-nine of the lakers were in Gulf of Mexico waters, 9 at Orange, Tex., 18 at New Orleans and 2 at Mobile, Ala. Of the remainder 90 were in the James river, 9 were at Hog Island, 7 at Staten Island and 14 at Jones Point. Movement of the lakers would have to be synchronized with the dismantling of the submarines to insure a steady flow of ships toward Fordson.

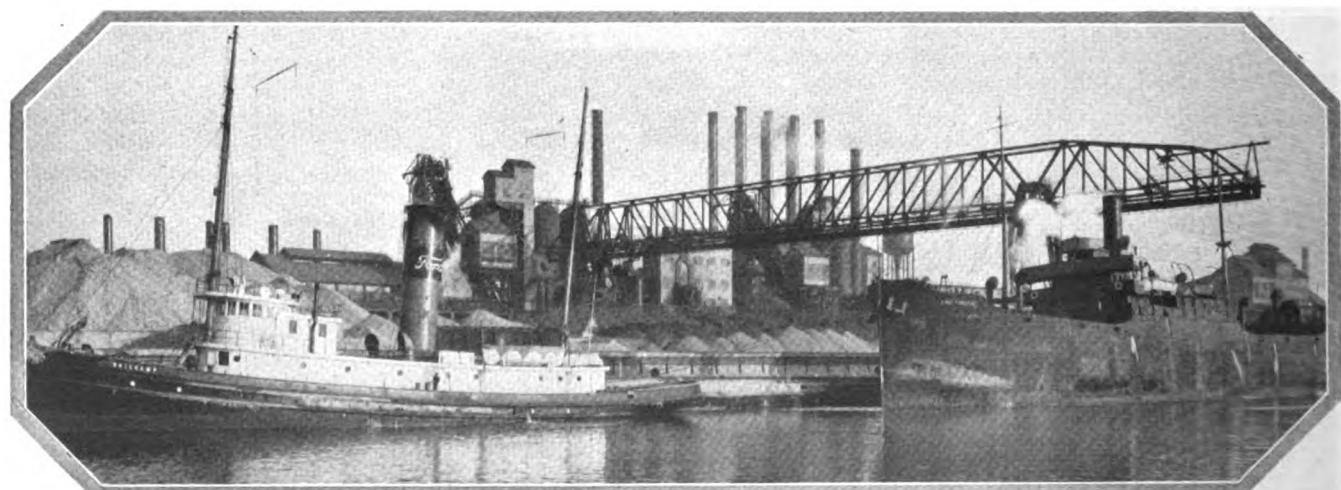
Moving the vessels under their own power was out of the question. Merely to recondition them sufficiently for the one trip would cost hundreds of thousands of dollars, an unwarranted expense. Towing was the only alternative. And the towing operation would be one of unprecedented proportions.

From Orange to Fordson was approximately 4332 statute miles. From New Orleans the distance was 4159 miles, from Mobile 4089 miles, from Norfolk 2483 miles, from Hog Island 2491 miles, from Jones point 2329 miles.

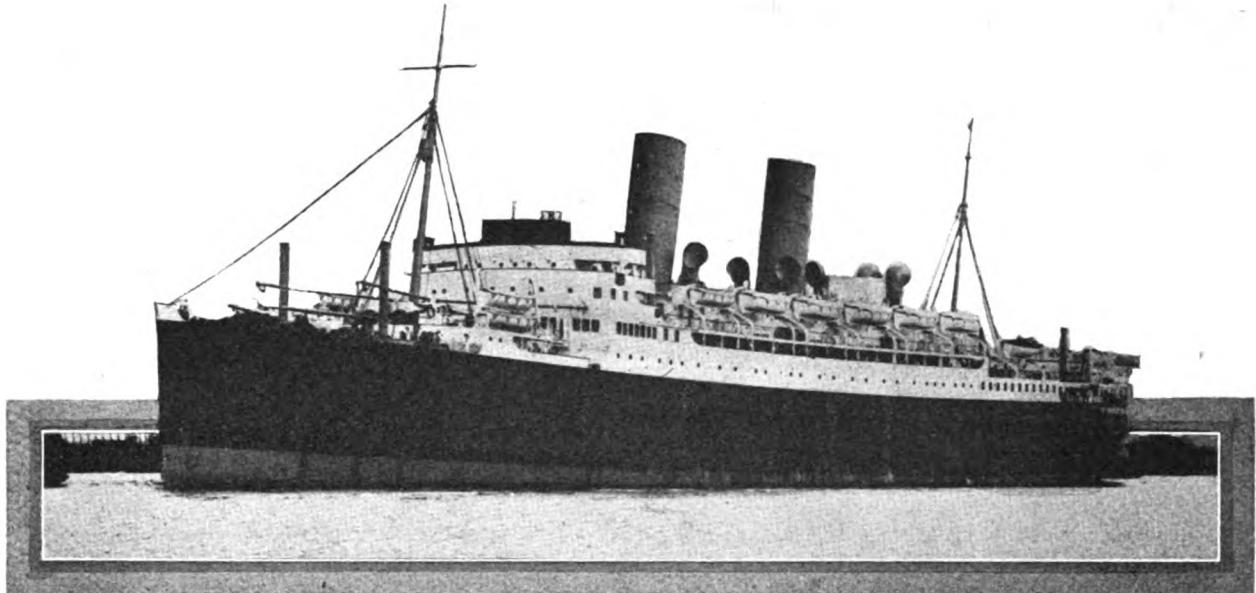
Getting the lakers to Fordson would constitute a ship movement of more than 418,000 miles. Nothing like it had ever been tackled by any company in history. And yet these figures did not include the mileage to be consumed moving the submarine-type vessels to the shipyards for dismantling, or towing the lakers from their anchorages to the shipyards for loading purposes, or the return trips of the towing steamers and tugs from Montreal to the different anchorages.

Such an undertaking, of course, would require most careful planning.

(Continued on Page 56)



Tug Ballcamp Arrives at Fordson with Lake Fondulac after Memorable 33-day Voyage from Kearny, N. J.



Duchess of Bedford—Built for the Canadian Pacific Railroad by Harland & Wolff

British Shipping and Shipbuilding Move Slowly to Better Conditions

By Vincent Delpot
European Manager of Marine Review

DISAPPOINTMENT is experienced in British shipyards at the contraction of new shipbuilding orders. The year had started under favorable auspices, but a study of conditions at the end of the first half of the year shows that, whereas launchings have been satisfactory, the tonnage of new orders received is not sufficient to start work on all the slips that have become empty. It is pointed out that, although Great Britain still is building more than half the tonnage of world vessels, other countries have captured a large number of contracts, owing to their lower costs. It is true that British prices have substantially decreased in recent years, and it is stated that a first-class cargo ship of about 10,000 tons deadweight, propelled by internal combustion engines of the latest type, can be turned out for about £160,000 (\$800,000), but continental yards have themselves, succeeded in bringing down their production costs.

The International Shipping conference was held in London at the end of June. The technical committees dealt with the various subjects grouped under the main heading of safety of life at sea, trade barriers, double taxation, bills of lading, compulsory passenger insurance, documentary agreements. Some measure of agree-

ment was reached on many subjects, but not on the equipment of all cargo ships with wireless. Sir William Seager, president of the chamber of shipping of the United Kingdom, was elected president of the conference.

An outstanding event in British shipping is the official announcement that Harland & Wolff, Ltd., of Belfast, is laying the keel of what will be the world's largest liner. The new liner, which will maintain the weekly service between Southampton and New York in place of the German-built HOMERIC, will probably be 60,000 tons gross, 1000 feet long and 100 feet beam. Although no official information has been given regarding the propelling machinery, it is believed that the system of electric drive in association with steam turbines will be employed. This ship will be built for the White Star line, recently taken over by Lord Kylsant and his associates, who also control the firm of Harland & Wolff. It is said that the liner will cost about £7,000,000 (\$35,000,000). It also is reported that the Cunard company contemplates building a new vessel to take the place of the MAURETANIA.

At the annual general meeting of Harland & Wolff, Ltd., Lord Kylsant stated that in respect of the year 1927, for the sixth year in succession

and for the twenty-first year in all, the concern headed the list of individual firms in regard to tonnage output, which, for 1927, reached 94,700 gross register tons, while the marine engine production was 80,575 indicated horsepower. However, it is a sign of the times that the firm decided to shut down on June 30 their shipyard at Greenock, Scotland, and concentrate their activities at their yards at Glasgow and Belfast. At Belfast the firm will now have under construction, in addition to the new mammoth liner, a 26,000-ton motor vessel, also for the White Star transatlantic service, two motor passenger ships of 20,000 tons, each for the South African mail service, and four 15,000-ton passenger and refrigerated motor vessels for South American trade. These, with a few additions, will total over 200,000 tons. On the

A number of launches and trials recently have been effected by the firm. On May 3 the M. V. HIGHLAND MONARCH and on June 21 the M. V. HIGHLAND CHIEFTAN were launched from the East yard, Belfast. The builder has a contract for five such ships for the passenger, refrigerated and general cargo trade of H. & W. Nelson, Ltd., to ply between the United Kingdom, Brazil and the Argentine. The principal dimensions

are: length, 520 feet, breadth, 69 feet, depth to upper deck, 35 feet 9 inches, gross tonnage, 14,450 tons.

On May 17 the M. V. KING ARTHUR was handed over to its owners, the King Line, Ltd., and on May 19 the M. V. KING WILLIAM, ordered by the same concern, was launched. This launching completes the contract for nine such vessels ordered by the King lines, and which were described in MARINE REVIEW of May, 1928. Two shallow draft oil tankers, TIA JUANA and PUNTA GORDA, ran satisfactory trials and were handed over to the owner, the Lago Shipping Co., Ltd., who has ordered five similar vessels. Their length is 315 feet, breadth, 50 feet, and gross tonnage about 2360. There is a derrick about 40 feet long for 5-ton lifts, arranged to ship on either fore or aft side of a derrick post amidships operated by a steam winch. The vessels are propelled by engines of twin-screw triple expansion type, developing 1100 horsepower.

The re-constructed firm of Workman, Clark, (1928) Ltd., at Belfast, has completed negotiations with Alfred Holt & Co., of Liverpool, for the building of a passenger and cargo ship for eastern trade. The vessel will be 470 feet long, with a dead-weight of 15,000 tons, and it will be propelled by twin-screw Burmeister & Wain engines.

Launchings Have Increased

Launchings of vessels on the Clyde during the first five months of the year were 87 vessels of 240,732 tons, substantially more than last year. Among the principal orders received lately is that for the construction of a passenger vessel of the Empress type for the Canadian Pacific Railway Co., given to the Fairfield Shipbuilding Co., of Govan. The ship will have the following dimensions: Length, 662 feet, breadth, 82 feet 6 inches, depth, 56 feet 9 inches, 10,200 tons gross deadweight; she is designed for a speed of 21 knots. The propelling equipment will be high-pressure water-tube boilers in association with single-reduction turbines. The vessel will be of a gross tonnage of something

over 25,000 and will cost approximately £1,750,000 (\$8,750,000).

The first of the four new Canadian Pacific liners which were ordered on the Clyde, the DUCHESS OF BEDFORD, illustrated at the head of this article, sailed her maiden trip from Liverpool for Montreal on June 2. The DUCHESS OF RICHMOND was launched on June 25. These two ships, together with the DUCHESS OF CORNWALL, still on the stocks, were awarded to John

325 feet in length, ordered by McIlwaith, McEachern, Ltd., of Melbourne, from the Caledon Shipbuilding & Engineering Co., Dundee. This vessel, intended for the Australian coasting trade, will have triple-expansion reciprocating engines and Bauer-Wach turbines. Wm. Beardmore & Co., Ltd., are to supply Bauer-Wach exhauster turbines for three Clan Line steamers, each of about 8840 tons gross and 11 knots speed. Scott's Shipbuilding & Engineering Co., Greenock, are completing for American owners a single-screw diesel-electric motor vessel of 9200 tons and 4000-horsepower engines from Belgium.

Slight Decline in Foreign Trade

Exports of British coal for the five months ended May 31, 1928, were less than in the same period of 1927, but more than in 1926 when the effects of the strike began to make themselves felt. The tonnage exported this year was 20,232,049, as against 22,005,967 in 1927, and 18,929,604 in 1926. Coal shipped for the use of steamers engaged in foreign trade during the first five months of the year was 6,867,296 tons this year, 6,707,525 tons in 1927, and 5,842,717 tons in 1926. The total value of exports of British goods, exclusive of bullion and specie, for the first five months of the year was £351,774,631 (\$1,710,000,000), as compared with £341,963,359 (\$1,660,000,000) in the corresponding period of 1927, and £343,952,854 (\$1,670,000,000) for 1926. As compared with 1927, there was a decrease of about £5,000,000 (\$24,500,000) in the value of coal exports; an increase of about £3,230,000 (\$15,700,000) for vehicles, including locomotives, ships, and aircraft; an increase of £2,527,000 (\$10,230,000) for machinery; an increase of £1,618,000 (\$7,850,000) for manufactures of textile materials other than cotton, woollens, and silks; an increase of £1,496,000 (\$7,250,000) for woolen and worsted yarns and manufactures; an increase of £1,211,000 (\$5,900,000) for leather and manufactures; an increase of £1,098,000 (\$5,070,000) for chemicals.

High Cost Shipbuilding

COST of shipbuilding in the United States is now the most serious obstacle to the complete rejuvenation of the merchant marine. In the accompanying article it is stated that a first-class 10,000-ton deadweight diesel freighter can be turned out in Britain for \$800,000. Only a few days ago one of the leading ship-builders in America told the writer that the cost of materials (many completely manufactured and semimanufactured parts, as well as raw material,) going into a ship today is in the neighborhood of 1½ times the shipyard's labor cost and material cost is now equal to the entire purchase price of a similar ship in Britain. On this basis the modern diesel vessel referred to above would cost, in an American shipyard, something over \$1,300,000.

Brown & Co., Ltd., while the fourth was given to Wm. Beardmore & Co., Ltd., at Dalmuir. These vessels are over 20,000 tons gross register; they are oil burners, with two sets of Parsons turbines with single reduction gearing, and the first big steamers to be fitted with boilers of the watertube type working under high pressure and superheat. The length is 600 feet and beam 75 feet; speed, 17½ knots. The full complement of passengers is 1600, and the crew and staff number 409. The cost of each ship is about £1,000,000 (\$5,000,000).

Among other recent interesting Clyde contracts are: a cargo steamer,

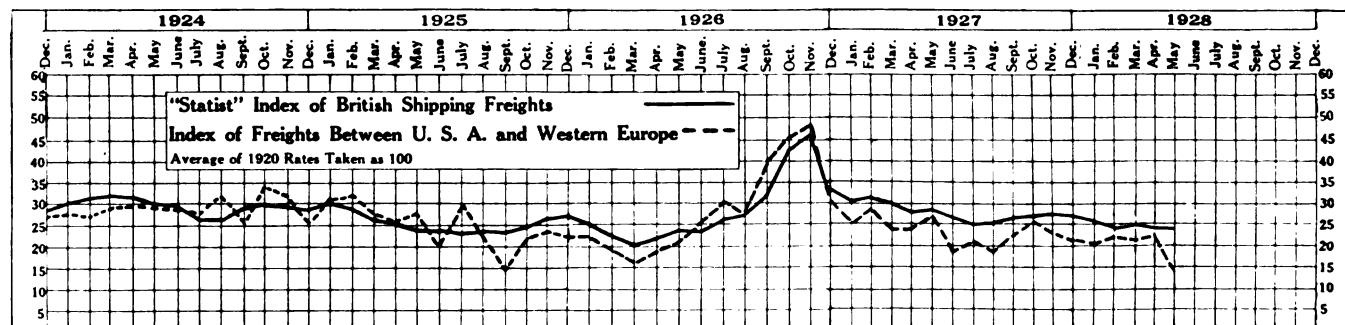
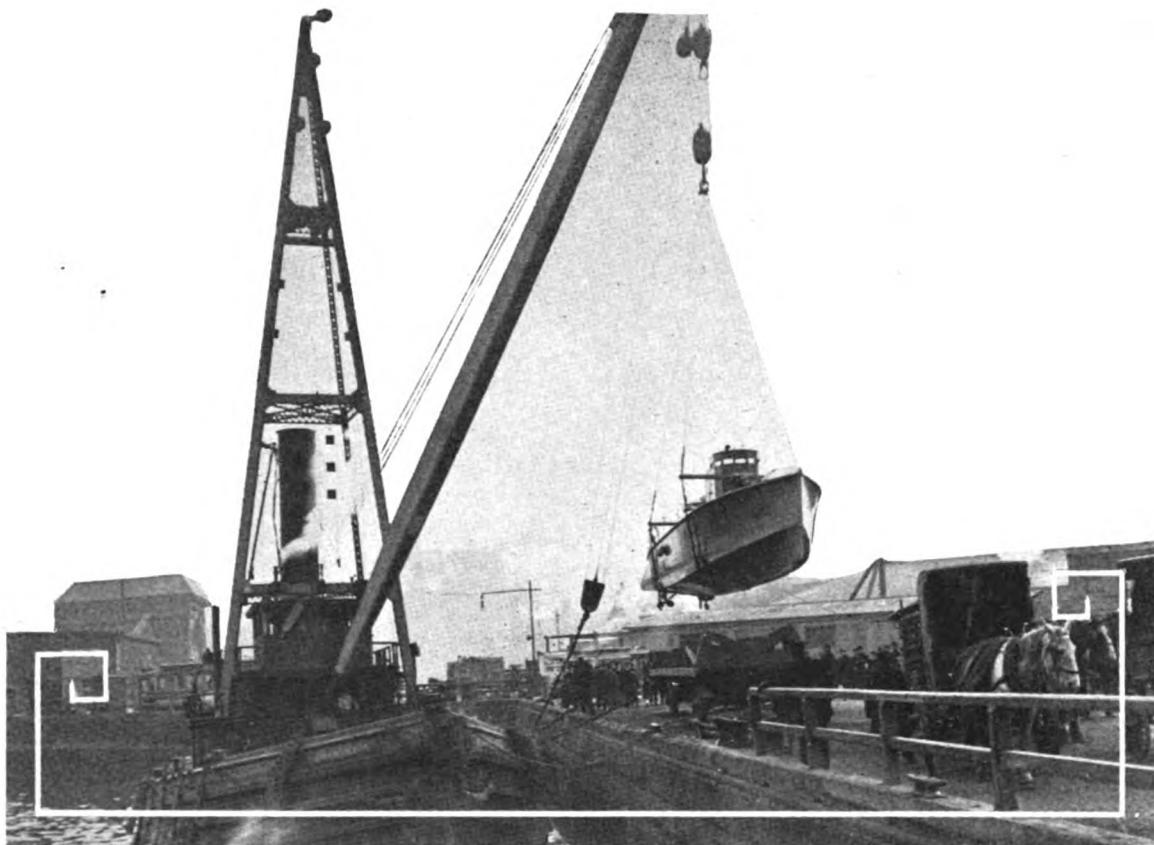


Diagram Showing Fluctuation of Ocean Freight Rates for Four Years and Five Months



Yacht Built in Antwerp Unloaded from Steamer at New York by Merritt-Chapman & Scott Corp.

Heavy Lift and Salvage Equipment Is Highly Developed at New York

By Joseph J. Glatzmayer

NEW YORK citizens who are prone to discouragement with the growing congestion of the city's streets would find much to relieve and encourage them if, for a moment, they would turn their eyes toward the well-ordered movement of their harbor's water-borne traffic. There they would see a rigid adherence to established rules and a skill and personal judgment exercised which, if applied to land transit, would go far to untangle the highways of the city.

New York harbor, though it accommodates the fastest moving marine traffic in the world, is not a "tangle" at all but has the safest, carefulest and best behaved traffic to be found. There is certainty and precision in the vessels' movements that is most reassuring; each is watchful and considerate of the pro-

ress of others. Proud liners move ponderously along to their berths, with entire confidence in the squat and powerful tugs which convoy them. Awkwardly shaped coal barges creep sluggishly along with their weighty burdens. Heavy laden cargo vessels cut cautiously across the busy lanes, choosing fairway with uncanny skill. Ferry boats, with their human freight, shuttle endlessly back and forth to Jersey, with a safety record which challenges any traffic stream, afloat or ashore. All is order and responsible conduct.

Tremendous Area of Port

Catching only short glimpses of the port's teeming waters, one easily may forget that its area is 175 square miles—room enough to set down five cities about the size of Rochester—and that some 10,000 vessels a year ply its waters, bound to or from ports abroad, besides its normal harbor and coastwise shipping. Government reports give New York's total water-borne commerce for 1926 as

something more than 391,000,000 net tons. Think of this if you will, as about three times the tonnage of Philadelphia, Baltimore, Boston, Los Angeles, San Francisco, Norfolk and New Orleans. The wharves and piers that accommodate this vast commerce stretch along a water front of 771 miles, only about 193 miles of which lie on the Jersey shore.

The tonnage of New York's water-borne commerce since 1913 has grown nearly 66 2/3 per cent; its net dollar value for 1926 was more than fourteen and three-quarter billion dollars. But even more noticeable than the growth in volume or value is the increasing size of all the individual units involved. Ships tower to new heights above their docks but there has been an amazing change, too, in the bulk and weight of the pieces of merchandise to be stowed in the holds of these 10,000 ships by the marine heavy-derrickman, a change which is creating constant

The author, Joseph J. Glatzmayer, is vice president of the Merritt-Chapman & Scott Corp. This article was submitted at the request of the editor by Robert D. MacMillan, 220 Broadway, New York City.

new problems for the heavy-lifter to solve.

In the course of a day's work in New York harbor, one almost may see the "balance of trade" struggling to maintain its balance; but, most often, it is the outbound ship which stows the bulkiest cargo, for America is master of the heavy machinery field.

Many Varied Heavy Weights

A score of marble blocks, weighing 5 to 25 tons apiece, may come out of the hold of an Italian ship; soon they will be decorating the walls of a New York office building or of a great hotel in the West. But into the hold an airplane may go, or perhaps an electric locomotive or a huge printing press. Not so long ago the trunk of a giant English oak was hoisted through the hatch of a British ship; it weighed eight tons and doubtless had grown for a thousand years; but it is furniture by this time, converted by a New York factory, and in its new form is being used and enjoyed in all parts of the world.

The safe handling of heavy weights is a fascinating feat of engineering, requiring the greatest of technical skill and experience and the costliest of modern equipment. In the picture you will see a huge steam locomotive; its 100 tons of weight is poised securely above the decks of a liner which might be crushed like matchwood should the wire slings slip; yet a modern derrick boat, such as Merritt-Chapman & Scott's MONARCH, which is holding it there, could lift the weight of two such pieces and set it down, lightly as a featherbed, in the waiting chocks on deck.

But it must not be thought that

all the interesting jobs of lifting are made so by the great weights handled; quite often it is the delicate handling required that makes the work notable. For example, there is another picture here which shows a beautifully-proportioned Dutch-type yacht, built in Antwerp for a wealthy American. Thin steel cables were run under the keel of the yacht as she lay on the deck of a freighter and, in just a few minutes, she was set down as tenderly as if she had been a crate of eggs.

The Handling of Animals

Nor are all the lifts that stir imagination confined to inanimate things. We may ship hydroelectric machinery to India to light the streets of her ancient cities but she in turn sends us an occasional elephant, for example, sad and disconsolate as he swings a hundred feet in the air, with several fathoms of Hudson River water beneath him. And there have been tigers, and leopards, and zebras, and sea-lions, too. Even a giraffe or so has tried with his neck to out-stretch the derrick boom.

These are strangely-assorted jobs and their number is great but, even so, not great enough to keep busy the fleet of fifty floating derricks which make headquarters at the Rosebank, Staten Island, station of the Merritt-Chapman & Scott Corp. Surplus capacity must be maintained for salvage work as well as for the hoisting jobs that do not fall within the heavy-lighterage classification. Every year, almost every day, sees some new development along the bordering shores of New York's port. Is there a great bridge under con-

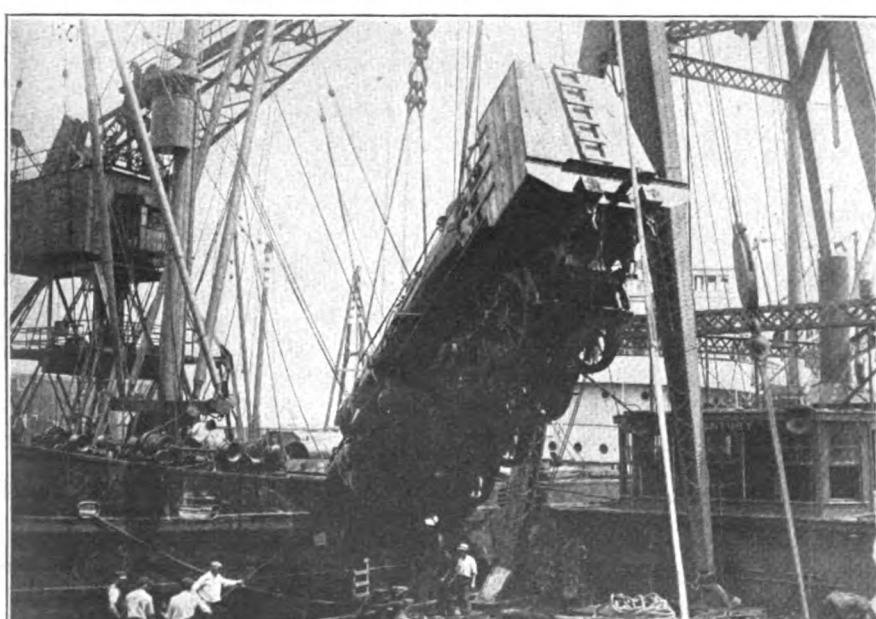
struction, such as the Delaware, Lackawanna & Western railroad is building across the Hackensack? Then there will be work for the derrick fleet, hoisting into place the heaviest structural members of the long steel spans. Are there new pier sheds or other buildings going up along the water front? Then the floating derrick method must serve them as well. There will be heavy materials to transport and unload, steel to place, piles to handle. Quite likely there will be work for the divers attached to these craft. These versatile submarine workers direct the placing of substructure members, set concrete forms, place cofferdams and, when the structure is completed, probably will go down below the surface with their under-water cutting torches and trim up the sheet piling.

Facilities Needed for Salvage

These facilities, ready any hour of the day or night for work in the harbor or along the coast, owe much of their completeness to another important factor: the salvage of ships in distress which, for nearly seventy years, has occupied the Merritt-Chapman & Scott Corp. and its predecessor companies. The eastern seaboard of the United States, though probably the safest and best-marked in all the world, naturally has its share—small though it be—of the marine disasters which occur wherever ships and foul weather are brought into conflict. Weather or circumstance may cause such a wreck anywhere, inside the harbor or "outside" along the coastline. In either case, the news of its happening gets action with incredible suddenness. The city fire department is no more ready and alert and no better equipped for its emergencies than is the modern salvage station such as those located at New York and New London in the East; at Norfolk and Key West in the South; at San Pedro, Calif., on the Pacific; and at Kingston, Jamaica.

Each salvage ship is in command of an expert wreckmaster; in his crew are men who have learned how to turn every blast of wind and wave to the advantage of the distressed vessel; there are competent divers ready to go below and report on the damage sustained, to apply emergency patches, to attach cables—to see or do, under water, almost anything that a good mechanic could do on land.

This giant floating derrick, the new MONARCH, was launched only last April. For her maiden job, she hoisted on a ship bound for Buenos Aires the 92-ton rotor of a great



LOCOMOTIVE WEIGHING 100 TONS LIFTED FROM DOCK TO SHIP

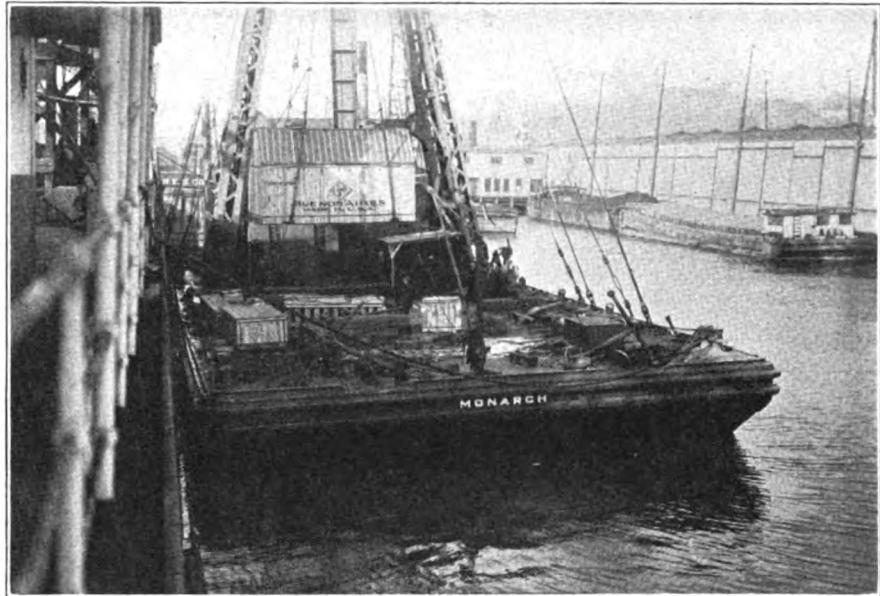
turbogenerator, built in this country for a South American power development. The MONARCH is capable of hoisting 300 tons with her 98-foot boom, which is built like a steel bridge. Her hull likewise is of steel and is so designed that water ballast compensates for her list when hoisting, thus tending to keep her on an even keel. The hull is constructed on the Ellis channel system and she not only is "Queen" of the Merritt-Chapman & Scott derrick fleet but the largest and finest vessel of her kind afloat.

And in the hold of these rescue ships is all manner of specialized gear that would be strange to the eye of the ordinary seafarer: anchors of special shape and weight, thousands of feet of great steel cables and of heavy rope, giant submersible pumps that work under water in the hold of the leaking or sunken ship, powerful drum hoists and derricks ready for instant use. At each of these principal stations is a warehouse filled with similar gear for the relief of distressed ships, much of it designed by the salvage company's own engineers and built in its own machine shops at Rosebank; but more important still than all the equipment is the long experience, the fine seamanship, and the willingness to go the limit which is a tradition among the workers in this hazardous field.

Saving Ship or Cargo

Often, of course, disaster comes swiftly and, sometimes, far from help; in such cases it may be too late to do more for the foundered ship than to save her cargo, if it be able to withstand the water; or it may only be possible to save the hull and thus minimize the loss. Occasionally there are marine wrecks right in the harbor; in fact there are three such now in New York.

Just below the Statue of Liberty is the freighter EL SOL, now lying almost "beam ends", with only the tip of a mast showing. She sank at once just where she struck in collision with another vessel one foggy night about a year ago, carrying down a valuable cargo of copper, lumber and other goods which later was salvaged, though the ship was a total wreck. Only a short distance away lies the hulk of the Norwegian freighter BESSENGEN, which likewise went down in collision; not only was the vessel a total loss but her cargo of sugar soon melted away, to sweeten the waters of the Narrows. The third wreck is of even more recent date and hence even better remembered; the United States government



GIANT FLOATING DERRICK MONARCH, WITH LIFTING CAPACITY OF 300 TONS

dredge NAVESINK, now lying just off Staten Island anchorage at Stapleton. She was trapped by a rushing ebb tide just before dawn on May 7 and, in the swift current, surrounded by other vessels, could not be maneuvered to safety; she struck another vessel broadside-on and sank even before her lifeboats could be launched. The fortunate presence of these other ships, with their lifeboat crews and searchlights, enabled the greater part of the crew to be rescued.

The first two vessels mentioned are now being removed, as menaces to navigation, under contracts given the Merritt-Chapman & Scott Corp. by the United States government. The NAVESINK, however, is to be raised and repaired; divers, in fact, are already applying the emergency patches and a huge cofferdam is being built onto the hull in preparation for pumping operations. It is an odd coincidence that the NAVESINK, with her cargo of 2200 tons of sand sucked out of the ship channel the night she sank, now rests on one of the great 42 inch steel water mains that carry Staten Island's water supply from the Catskill aqueducts and that these submarine mains were laid by the Merritt-Chapman & Scott Corp. which also is raising the NAVESINK.

These are widely-varied tasks, and a fleet of vessels, each versatile enough in men and equipment to turn from one of them to another, is a real economic asset; but the vast stream of commerce flowing through the Port of New York, "America's gateway," not only creates the need but the means to satisfy it. No other world port can match the ser-

vice facilities of New York harbor because none other could provide them with sufficient employment.

Atlantic Works Sold to Bethlehem

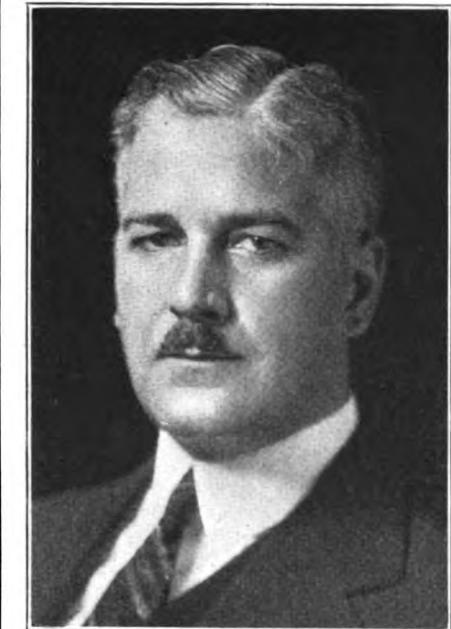
The Atlantic Works, East Boston, Mass. founded in 1853 and continuously operated as a shipbuilding and shiprepairing plant ever since that time has been taken over by the Bethlehem Shipbuilding Corp., Ltd. This company's facilities at the Port of Boston for all kinds of marine repairs including dry docking and major work as well as miscellaneous machine and boiler work have therefore been more than doubled. The newly acquired plant is located on the main ship channel a short distance north of the Simpson Drydock plant. The two Bethlehem yards in East Boston will now be designated as the Boston plant—Simpson works and Atlantic works.

The two yards provide the following dry docks: three floating docks, of 10,000, 6500, and 360 tons capacity respectively; three graving dry docks, of 465, 256 and 164 feet in length respectively; and three marine railways of 2000, 1000 and 500 tons capacity respectively.

The shops at these yards are completely equipped with all tools and machines required for any kind of marine and miscellaneous machine and boiler work.

George H. Stebbins, superintendent of Simpson Drydock plant has been placed in charge of both plants directly responsible to S. W. Wake-man, vice president of the Bethlehem Shipbuilding Corp., Ltd.

Opens New Passenger Offices



Blank & Stoller, Inc.

CAPT. C. M. Armstrong, general passenger manager for Furness, Withy & Co., has been placed in charge of advertising and publicity in addition to his regular duties.

The Furness, Withy & Co. operating the Furness Bermuda line, The Trinidad line, as well as cruises to Quebec, West Indies, Nova Scotia and Newfoundland, has opened new and luxurious offices at 565 Fifth avenue for the convenience of the traveling public.

Decorated for Rescue

Shortly after the *LEVIATHAN* tied up in the Boston Commonwealth drydock for her semiannual inspection on July 21, Giles C. Stedman, navigating officer of the *LEVIATHAN*, flagship of the United States lines' fleet, was decorated for his participation in the rescue of the crew of the Italian freighter *IGNAZIO FLORIO* on Jan. 18, 1927. Mr. Stedman was then chief officer of the *PRESIDENT HARDING* and was in command of the life boat that made the rescue.

Agustino Ferranti, Italian consul general in Boston, made the presentation on behalf of the Italian government. The ceremony was held on the bridge of the *LEVIATHAN*, and was witnessed by Commodore Harold A. Cunningham, master of the liner; Commissioner Edward C. Plummer, vice chairman of the United States shipping board; Commissioner S. S. Sandberg and General A. C. Dalton, vice president of the Merchant Fleet Corp. Following the presentation a luncheon was held aboard the ship.

Mr. Stedman is from Quincy, Mass.

Sailing Foreign on an American Ship Why the Flag Is on the Seas to Stay

By Stephen E. Palmer

HOG ISLAND is a memory mellowed by a decade. Philadelphia may have her promised "Hundred million dollar commercial dock"—I don't know. But the romantic thing about Hog Island—her span of "a bridge of ships"—what of them? Fifty "A" ships, sixty "A2" ships, seventy "B" ships, a hundred and eighty of them. Were they burned like the West coast fleet? Not enough green wood in them. Were they scrapped near Detroit? Too big for the Welland canal. Or did they wither away in the heat of congressional debate and committee investigation? To a midwest landlubber the last was a wholly adequate explanation—if not accurate.

We are between Malta and Alexandria on our cruise from New York on a Hog Island ship. She carries the name of her line, beginning with "American," in eight foot block letters along her sides. Her captain and chief engineer are Virginians hook-bait-line-and-sinker, the three mates are American citizens, and she

is manned by a typically American crew. Her east-bound revenue is \$43,000 so we eat the steward's delicacies with impunity five times a day and sleep soundly twice every 24

hours without any senatorial nightmares about the bankruptcy of the American merchant marine. She is one of twenty such ships purchased from the United States shipping board by the company which in its management is not wholly disconnected (so it is rumored) from a certain American railroad which "hauls more freight, more passengers, more miles, etc."—anyway a friend of mine says that it always pays its dividends. That sound American business is taking the shipping industry seriously and doing it successfully is one of the revelations of sailing on a Hog Island ship.

Hog Island Ships in Service

All of the Hog Island ships are in active service, either in the 26 lines operated by the United States shipping board or in independent lines such as this. You can tell a Hog Island boat by its rivets; they are built to stay together. Also by their engine installations which have been remarkably free from trouble. Some of our friends across the water predicted that they would all be worth-

(Continued on Page 54)

In The Editor's Mail

THE following letter, written from Constantinople, Turkey, dated June 20, 1928, addressed to the editor and attached to the manuscript of the accompanying article, was received on July 18.

"While coming over from the States on the BLUE TRIANGLE of the American Export lines I became interested in the file of MARINE REVIEW which Captain Hudgins had on board, and found myself—a midwest landlubber—in hearty accord with your point of view regarding American shipping. One day I jotted down some reactions as they came to me and I am enclosing them for whatever value they may be to you.

"With hearty wishes for the continuance of your straight forward, straight-thinking work, I am"

Stephen E. Palmer

The author, Stephen E. Palmer, is pastor of the First Presbyterian church, Waukesha, Wis.

Open Big Dock Extension at Bristol

BY JOSEPH HORTON

THE Port of Bristol is next to Liverpool the most important of Britain's western water gates. It is particularly useful as a link with the Midlands, and will be increasingly so when the long projected ship canal communicating with Birmingham is constructed. The port, however, has excellent railroad connections with the Great Western railway, which has a complete set of sidings touching the port at various points. There is direct communication also with the London, Midland & Scottish railway.

On May 23 the Prince of Wales opened the new extension of the Royal Edward dock at Avonmouth, a sum of £1,250,000 having been spent on this improvement. This extension commenced in 1902 and the dock was declared open by King Edward in July 1908. Since that time £4,816,000 has been spent on extension and equipment, bringing the total capital expenditure up to £8,650,000.

The entire dock system of the port is owned by the Corporation of Bristol, and its administration is vested in a docks committee of the city council operating as the Port of Bristol authority.

The docks at Avonmouth—Royal Edward dock and Avonmouth dock—lie at the mouth of the River Avon on the east bank, at its junction with the Severn estuary and within the city of Bristol municipal boundary.

Sir William Arrol & Co. Ltd. of Glasgow has constructed the wharf and buildings and carried out the necessary excavation. The new arm of the dock is about 1700 feet long and 400 feet wide, and there will be provision for three deep water berths on each side. The east side of the extension, which forms a prolongation of the eastern face of the Royal Edward dock, is equipped with two transit sheds, a transit silo granary and a grain conveyor gallery. Ample room is left for further buildings and extensions. The wharves are constructed of reinforced concrete and consist of a series of frames, built at intervals of 12 feet 6 inches between centers, carried on reinforced concrete piles. The water area of the Royal Edward Dock is 62 acres and the land area 747.

The transit sheds have each an internal capacity of approximately 2,600,000 cubic feet of air space. Each shed has a flat roof, a portion of which is covered with a steel building with slated roof, and the shed equipment includes electric roof cranes and two electric lifts in each shed. The transit granary has a capacity of 480,000 bushels of grain. For hauling the grain a continuous gallery has been constructed, for the full length of the east wharf, above the verandas of the transit sheds. This gallery contains a series of conveyor bands fed by traveling pneumatic

elevators which discharge direct from vessels lying alongside the wharf. With its modern weighing and distributing apparatus, it is claimed that this grain handling plant is the most up-to-date in the kingdom. Three other granaries have a combined capacity of 2,000,000 bushels, in the vicinity of the Royal Edward dock.

The work of construction has been carried out on somewhat original lines. The bulk of the material was removed by an Arrol-Whittaker steam navvy, on caterpillar wheels, which did very successful work. The final depth of 10 feet was removed by dredging. The total quantity of excavation was approximately 500,000 yards. Water was admitted into the new extension on June 9 last year, when dredging operations commenced. By November 17 these were completed when 350,000 cubic yards of material had been removed.

The pile driving methods are considered novel. Steel piling frames were used and the piles were driven with a dead drop "monkey" of 3½ tons weight. The "monkeys" were operated by 80 horsepower electric motors with friction drives, and the results obtained were most efficient and expeditious. The total number of piles driven was 4582, and the lengths varied from 54 to 62 feet. The heaviest pile weighed about eight tons.

Reconstructed Transit Sheds Bristol City Docks.
Coastwise and Continental Shipping



Below—This old British port is being modernized in an energetic and intelligent manner to greatly increase its capacity and efficiency—Royal Edward Dock extension sheds U and V and Transit Granary at Port of Bristol



Below—Royal Edward Dock Extension Port of Bristol—Transit Granary of 12,000 tons capacity connected by conveyor galleries to storage granaries in the background. Shows one half length of one side of extension



Automobile and Passenger Ferry Bainbridge Powered with One Eight Cylinder 800 B. H. P. Diesel Engine

New Diesel Ferry Enters Service Between Seattle and Port Blakely

By Robert C. Hill

TYICAL of the changes in inland water transportation on Puget sound, due to the universal use of the automobile, the diesel ferry BAINBRIDGE has just entered service between Seattle and Port Blakely, Bainbridge island. Not many years ago practically all traffic on Puget sound was handled by passenger and freight steamers. These are gradually being displaced by diesel driven passenger ferries of which the BAINBRIDGE is the largest and most modern.

This vessel is now one of six automobile ferries radiating from Seattle, five of which in 1927 carried 102,274 automobiles, an increase of 25 per cent over 1926. The BAINBRIDGE has a capacity for 1000 passengers and 90 cars.

Launched May 19, the new ferry underwent successful trials on June 21 and on the same day entered regular service over a run slightly more than 14 nautical miles for the round trip. The vessel operates with two shifts from 6 a. m. until midnight. Since going into commission the ferry has averaged 11 knots, although the machinery is not yet shaken down.

She handles with exceptional ease and the quick pickup and quick stop are especially pleasing to the owners.

The BAINBRIDGE is a double ended type constructed entirely of Douglas fir and is of the following dimensions: Length, 187 feet 8 inches overall; molded beam, 57 feet 8 inches; molded depth, 16 feet. She was built at the Lake Washington shipyards, Houghton, Wash.

Novel Features of Design

The new vessel was designed by Capt. John L. Anderson, president of the owning company, the Kitsap County Transportation Co. Captain Anderson has been engaged in inland water transportation in and near Seattle for 30 years and the BAINBRIDGE represents the results of his extended experience in the requirements of the service. The timbers of Douglas fir were cut in the winter and especially seasoned for this job. The hull construction is extra heavy. The design is known as a modified V-bottom type, which Captain Anderson says, gives increased strength, stability and speed

efficiency at 15 per cent less construction cost.

For power the BAINBRIDGE has a double-ended, double-clutch type Washington-Estep marine diesel engine of 800 brake horsepower, the engine having eight cylinders in line, each being 17-inch bore and 24-inch stroke, and the engine turns at 190-200 revolutions per minute. This type of drive with a clutch at each end of the engine has been thoroughly tried out by the Kitsap County Transportation Co. in its ferryboat KITSAP, which is powered with a 600-brake-horsepower engine of the same make, and which has given perfect service for the three years she has been in operation.

The double-clutch type of drive gives by far the most efficient results in double-ended ferryboat service, due to the fact that only five to six per cent is lost in efficiency from the idle forward propeller, while it has been demonstrated that from 17 to 20 per cent of the power is lost in the solid hook-up with positive drive to propellers on both sides. This great loss comes from the force of the water

in the wake of the forward propeller reacting on the hull. Therefore the double clutch type drive results in a gain of from 12 to 14 per cent in overall efficiency over the solid hook-up type of drive.

Another point of advantage for the clutch system is its extreme simplicity, requiring as it does a simple nonreversing engine with two one-way nonreversing clutches coupled to left and right-hand propellers, with which can be obtained instant action, perfect control for the ship and better steering control when making landings.

In reading through the engine specifications covering the 800-brake-horsepower engine, attention should be called to the accessibility of the design, which incorporates removable cylinder liners, open side main frame construction, pistons removable through base of engine without dismantling cylinder heads and valve gear, large removable exhaust and inlet valves, the assemblies of which are interchangeable, and force feed oiling system.

Good Maneuvering Properties

Another feature of this engine is its extreme flexibility. It can slow down to as low a speed as 40 to 50 revolutions per minute in making landings. This flexibility is obtained by perfect atomization in the direct

(solid) injection of fuel, which eliminates the refrigerating effect of expanding air. It also permits of a much simpler machine, with a gain of at least 10 per cent in mechanical efficiency.

The auxiliary equipment consists of one two-cylinder 8½ x 10-inch, 450 revolutions per minute Washington-Estep diesel engine, direct connected to a 25-kilowatt 115-volt compound-wound direct-current Westinghouse generator, all mounted on a common sub-base, making a complete self-contained unit. This unit furnishes all electricity used aboard for lighting, cooking and driving the various electric motors hooked up to the other auxiliaries described herein.

For an auxiliary air compressor, a small unit is belt-driven by a small suitable sized electric motor.

In addition to the 25-kilowatt generator described above, there is a 5-kilowatt 115-volt compound-wound direct-current Westinghouse electric generator mounted on heavy rigid brackets attached to the main 800-brake-horsepower engine, and driven off the engine flywheel with a leather belt and suitable idler pulley.

For bilge service, a Moran bilge pump, 2½-inch discharge and 3-inch suction, with 350 gallons per minute capacity at 20-foot head, is direct

connected to a 5-horsepower Westinghouse direct-current motor at 1450 revolutions per minute. Both the pump and the motor are mounted on a common sub-base, making a complete self-contained unit.

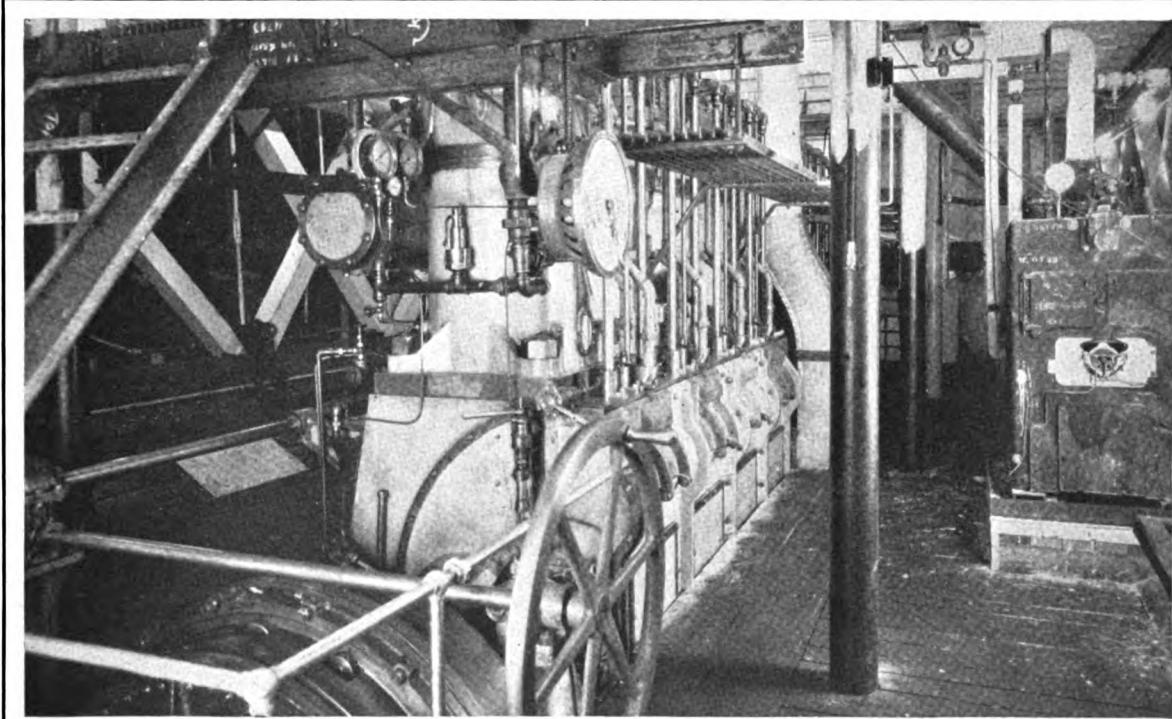
The fire pump is a Moran two-stage centrifugal pump, 3-inch discharge, 4-inch suction, high pressure, brass fitted, and driven by a direct-connected 25-horsepower Westinghouse direct-current motor, turning 1750 revolutions per minute.

The pump has a capacity of 200 gallons per minute at a pressure of about 100 pounds. The pump and motor are mounted on a common cast iron sub-base, and are coupled together with a flexible coupling.

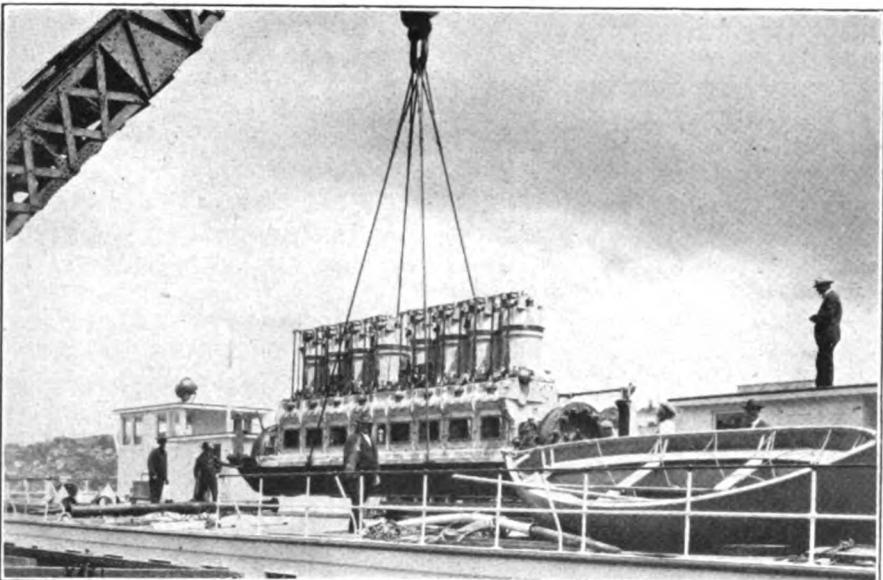
The vessel is equipped with 90 cells of B6H Edison batteries, which are wired so that they charge continuously off the generator mounted on the main engine, and they are automatically cut out when the main engine generator falls off in speed.

Has Additional Auxiliaries

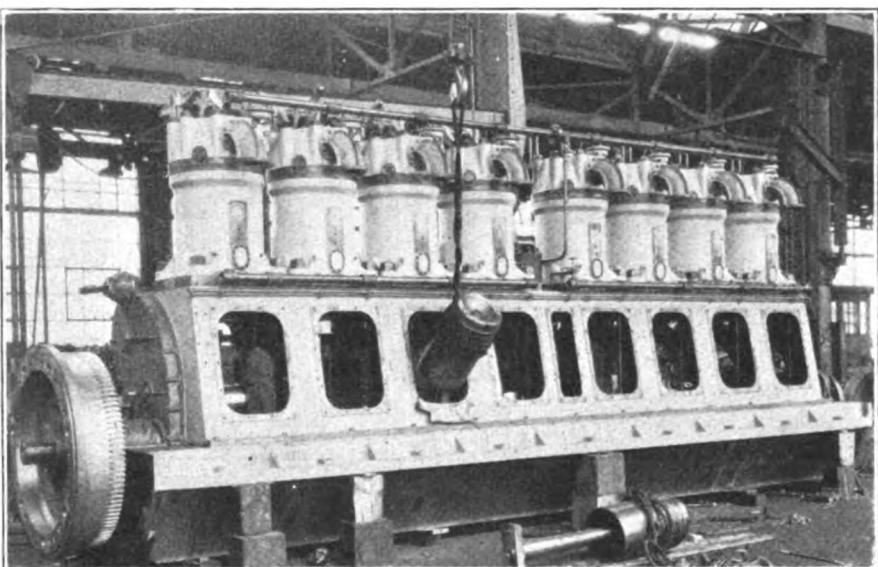
The sanitary pump unit is a motor-driven gear pump, with a capacity of 600 gallons per hour and with automatic tank control, piped to a suitable sanitary tank of about 300 gallons capacity, which is placed on the hurricane deck. The pump starts and



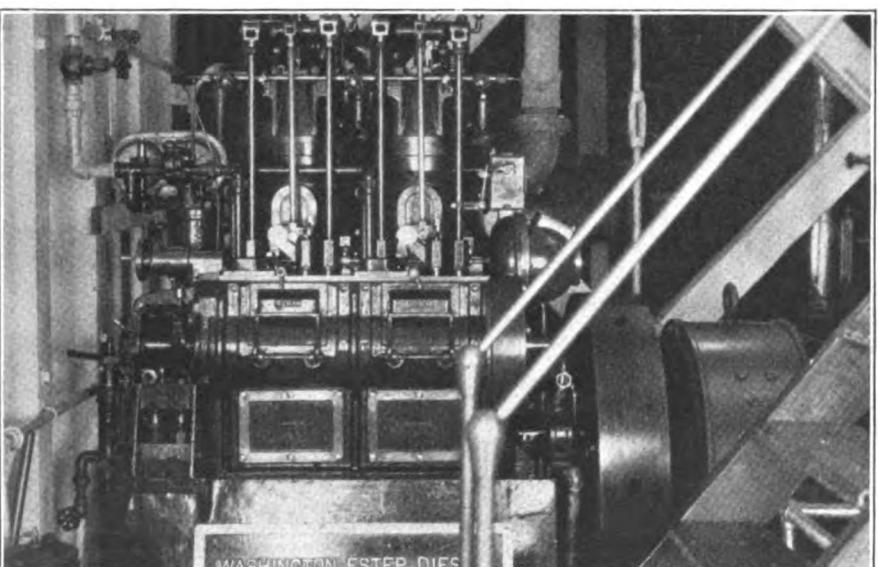
Operating Side of 800 B. H. P. Washington—Estep Diesel in Ferry Bainbridge



LOWERING 800 B. H. P. WASHINGTON-ESTEP DIESEL INTO FERRY BAINBRIDGE



REMOVING PISTON FROM 800 B. H. P. WASHINGTON-ESTEP DIESEL ENGINE



25-KILOWATT AUXILIARY GENERATING SET ON FERRY BAINBRIDGE

stops on a variation of pressure of 10 to 20 pounds.

For fresh water a Delco light fresh water pump unit outfit, model 104, is in service. This is piped to the fresh water tank located in the hold and from the tank to the various fresh water outlets on deck.

For the heating of the vessel, a low pressure steam heating system is provided. This consists of one Ideal sectional cast iron boiler equipped with an automatic duel oil burner, the boiler having a capacity of about 1200 square feet of radiation. There is a metal drip tray under the boiler with the edge turned up 4 inches all around and welded corners. Under this drip pan there is a layer of brick, with a sheet of $\frac{1}{4}$ -inch asbestos mill board between the brick and pan.

A very elaborate switchboard panel is provided, which is up-to-date in every way. It contains voltmeters, ammeters, special designed automatic battery charging and discharging series parallel switch, and an automatic generator no-voltage release. The above switchboard and power wiring was manufactured and installed by the Marine Electric Co., Seattle.

The exhaust muffler is a Washington-Estep special silent exhaust muffler designed and manufactured by the Washington Iron Works, builders of the main and auxiliary power plants. This muffler is mounted on suitable brackets in the smokestack, and the main engine exhaust pipe, which is piped from the center of the exhaust manifold to the muffler, is covered with metal lath and asbestos from the engine to the main deck level.

The BAINBRIDGE is equipped with a De Laval No. 302 oil purifier. This purifier has a capacity of 60 gallons per hour, and is connected up so that it operates continuously out of the lubricating oil strainer tank to the engine sump.

Launch Diesel Tanker

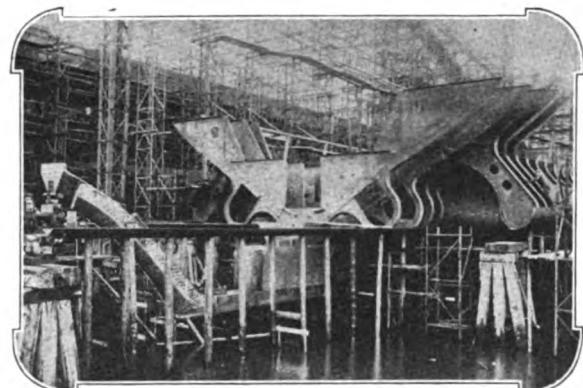
The diesel oil tanker SUN, building at the Sun Ship Building and Drydock Co., Chester, Pa. for the Sun Oil Co. was launched on July 14. The sponsor was Miss Ethel Pew.

The new tanker is 480 feet long, 65 feet beam and 37 feet molded depth and of 13,000 tons deadweight. She is propelled by two Sun-Doxford opposed piston type diesel engines, each of 2800 horsepower. It is expected that fully loaded, the new vessel will have a speed of 12 knots.

Latest Marine Events in Pictures

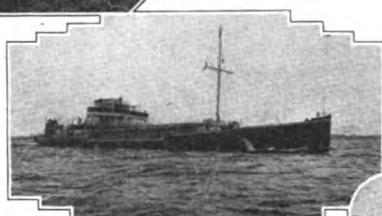


At left—First class smoking room on the new twin screw motorship Orinoco, one of two vessels operating in the West Indies and Central America service of the Hamburg-American Line



Above—Stern view of the Bremen, sistership of Europa, under construction. Shows provision for four propellers. Little information available on these two interesting liners. They are expected to exceed present-day liners in speed and luxury. They represent German Lloyd's serious attempt to capture the blue ribbon of the Atlantic

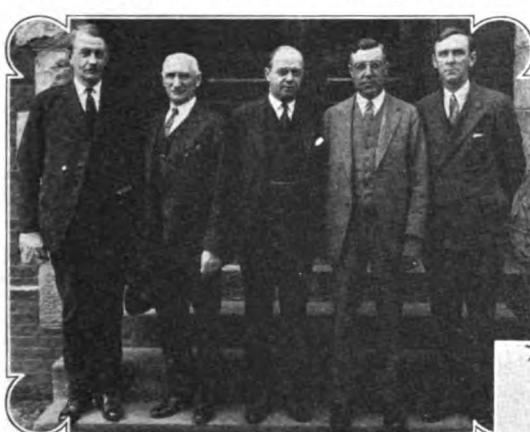
At right — Geheimrat Brennecke, largest European dredge, recently completed at Kiel for service in Wilhelmshaven harbor



Below—Executive personnel, Bath Iron Works Corp., Bath, Me. From left: H. O. Trowbridge, chief engineer; A. M. Main, vice president and naval architect; W. S. Newell, president and general manager; L. E. Thebeau, treasurer; R. F. Hill, general superintendent



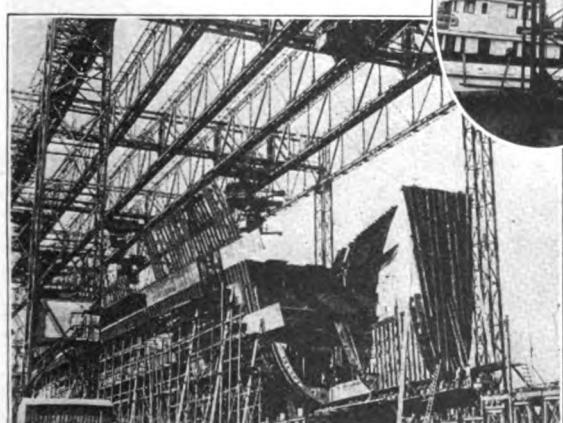
At left—Upper Mississippi towboat C. C. Webber with six barges near Bellevue, Ia. One of four she has proved very satisfactory. Fitted with twin tandem compound condensing engines



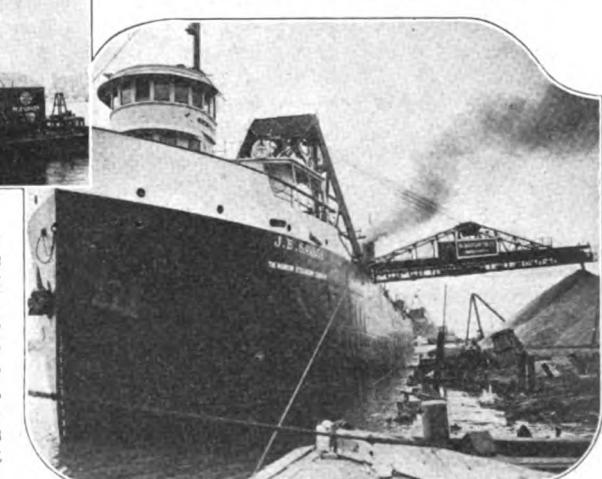
At right—A tense moment. The S. S. Leviathan of the United States lines just as she is casting off from her pier at New York



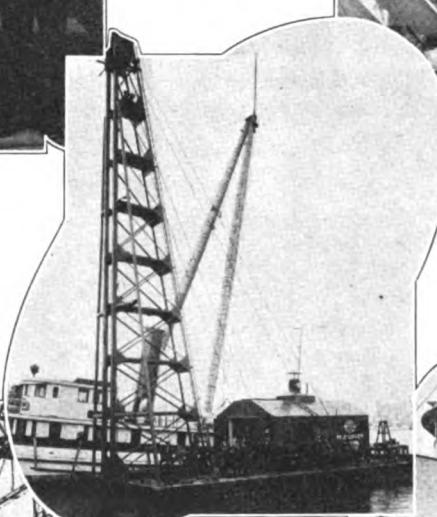
Below—S. S. Europa, new liner for North German Lloyd, in frame. It is said that this vessel and sister ship Bremen will make 27½ knots, cutting the ocean trip to four days. Length is 937 feet, some 17 feet shorter than the Majestic and 11 feet shorter than the Leviathan

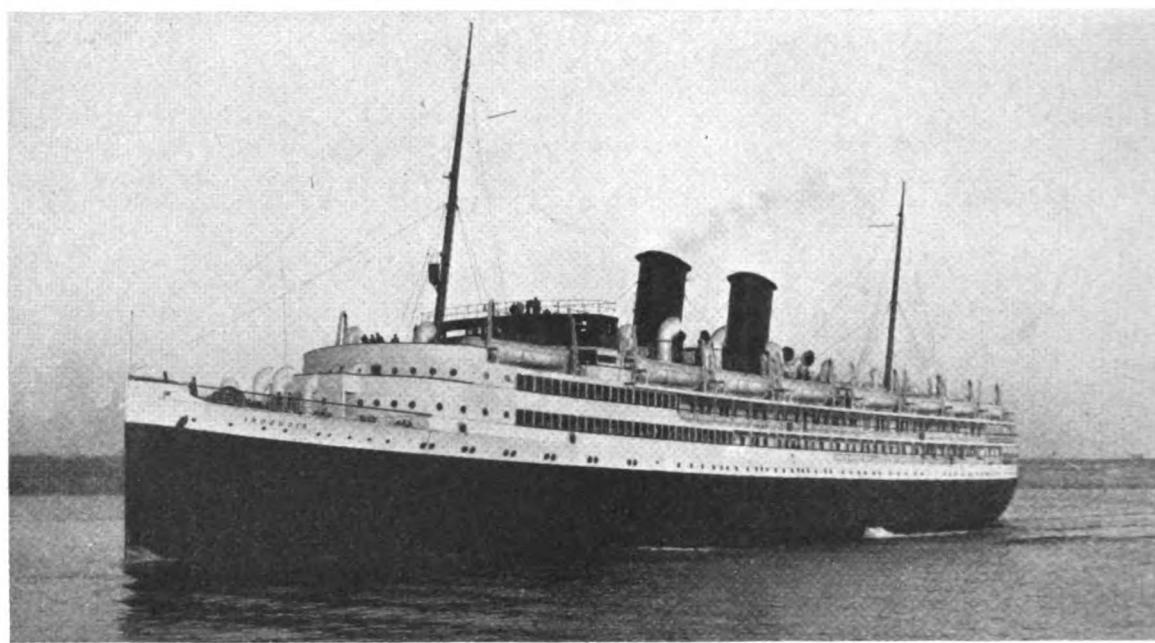


Above — Pile driver barge for New York Central. Hull built on channel steel system at Atlantic Works, Boston. Dimensions 58x26x6 feet



Below—Recently completed self unloader J. E. Savage of Morrow Steamship Co. delivering her first cargo of coal. Self unloading system designed and installed by Leathem D. Smith Dock Co., Sturgeon Bay, Wis.





Newest Clyde Liner the S. S. Iroquois Equipped with Electric Auxiliaries

Electric Auxiliaries Increase Steamship Operating Efficiency

By E. F. Clark

THE use of electric auxiliaries on ships followed naturally the introduction of diesel engines for propulsion. It was early found to be uneconomical to provide a separate steam plant for the auxiliary load, so that at the present time electrified auxiliaries for motorships are the accepted standard. And although fuel economy has been the predominating factor in this adoption of electric power, experience has shown the value of many other factors.

Vessels converted from steam to diesel propulsion where the original steam auxiliaries, either deck or engine room, have been retained with part of the steam boiler plant in order to save the cost of diesel generating sets and new electrically driven auxiliaries, have proved so relatively uneconomical in auxiliary operation that this practice has not been repeated.

Actual comparisons of fuel econ-

omies between similar ships with diesel electric and steam auxiliaries respectively, show for fuel consumed in port a ratio of 15 to 1 in favor of the diesel electric, with cases where the ratio has been as high as 33 to 1. Similar comparisons of the fuel consumed at sea for the auxiliaries that are comparable (eliminating the condenser pumps, boiler feed pump, boiler room auxiliaries and evaporator of the steamship) show a ratio of approximately 10 to 1 in favor of the diesel electric.

The foregoing economies are responsible for a present day tendency to install diesel electric power for auxiliaries on steamships and this is now being followed out on a number of new steamships abroad. The principal advantage at sea lies in the saving of power supplied to the inefficiently operating auxiliaries, the absence of auxiliary steam and exhaust piping and the general convenience and simplicity of the electric motors and control.

Auxiliary steam requirements for

feed water heating and study of heat balance sometimes show that overall economy is in favor of electric auxiliaries with power furnished by turbine generators rather than diesel generators. In port, however, the diesel generator will show a very distinct gain in economy, especially if the steam boiler plant may be shut down. Whether to install diesel or turbine driven generators, or a combination of both, for the electric auxiliaries of a steamship is therefore a problem involving the relative port and sea auxiliary loads which requires a careful study for each installation.

Steam Electric Auxiliaries

Experience gained from electric auxiliary installations on steamships to date and economic studies made by Westinghouse marine engineers show, generally speaking, that economies resulting from such installations will more than repay their extra first cost. The major portion of engine room auxiliaries and the steering gear

This article was especially prepared for MARINE REVIEW by the author, E. F. Clark, of the Westinghouse Electric & Mfg. Co.

can be economically electrified in practically all cases. This also applies to the cargo handling and deck machinery of cargo and passenger steamers to a degree proportionate to the time spent in port as compared with that at sea. In other words a relatively fast ship operating from New York to Cuba would show a very appreciable gain in fuel economy with electric deck auxiliaries, whereas a slow freighter operating from New York to China would not have the opportunity to show a similar gain.

Passenger ships will practically always show ample economic justification for both deck and under-deck auxiliary electrification, while the use of higher steam pressures and superheat also adds to the economic value of this type of equipment.

First cost of the generating plant is the principal item of expense in comparing electric and steam auxiliaries. On many steamships especially passenger carrying types, the generating plant as installed for lighting, ventilation and heating, need not be increased appreciably to take care of the electrical load for cargo handling and deck machinery. On steamships having electrical engine room auxiliaries or electrified galley, the generating plant installed for these purposes will serve in port for the deck auxiliaries. And conversely, where the deck machinery is already electrified, the generating plant is there to make the electrification of the engine room auxiliaries and galley equipment advisable.

Carefully studied heat balance analyses which are substantiated by

actual operating records show that there is a saving in overall fuel consumption of 7 to 12 per cent, depending upon the types of ships considered and the operating steam pressure used, which results from electrifying the engine room auxiliaries only. In view of the fact that mature consideration is given any development of marine engineering that will produce an equal saving in fuel consumed at sea by the main engines without encroaching upon the all important requisite for reliability, the economies of electrified engine room auxiliaries are well worth investigating.

Fuel saved through the difference in efficiency of the electric and steam auxiliaries is only part of the story, however. Other important considerations advantageous to the electrical engine room auxiliaries are shown by the experience of shipowners. Maintenance of electric generators, motors and control is practically negligible, which is not the case with steam auxiliaries. There is a saving in maintenance of auxiliary steam and exhaust lines and valves, also a saving in fuel to offset the radiation losses of auxiliary steam piping; also of steam and fresh water lost through leaks in piping, valves and the stuffing boxes of auxiliary engines.

The engine room is cooler due to absence of auxiliary steam piping, and less ventilation is required. Absence of auxiliary piping adds room and materially improves accessibility to all parts of engine room.

The many wearing parts of recipro-

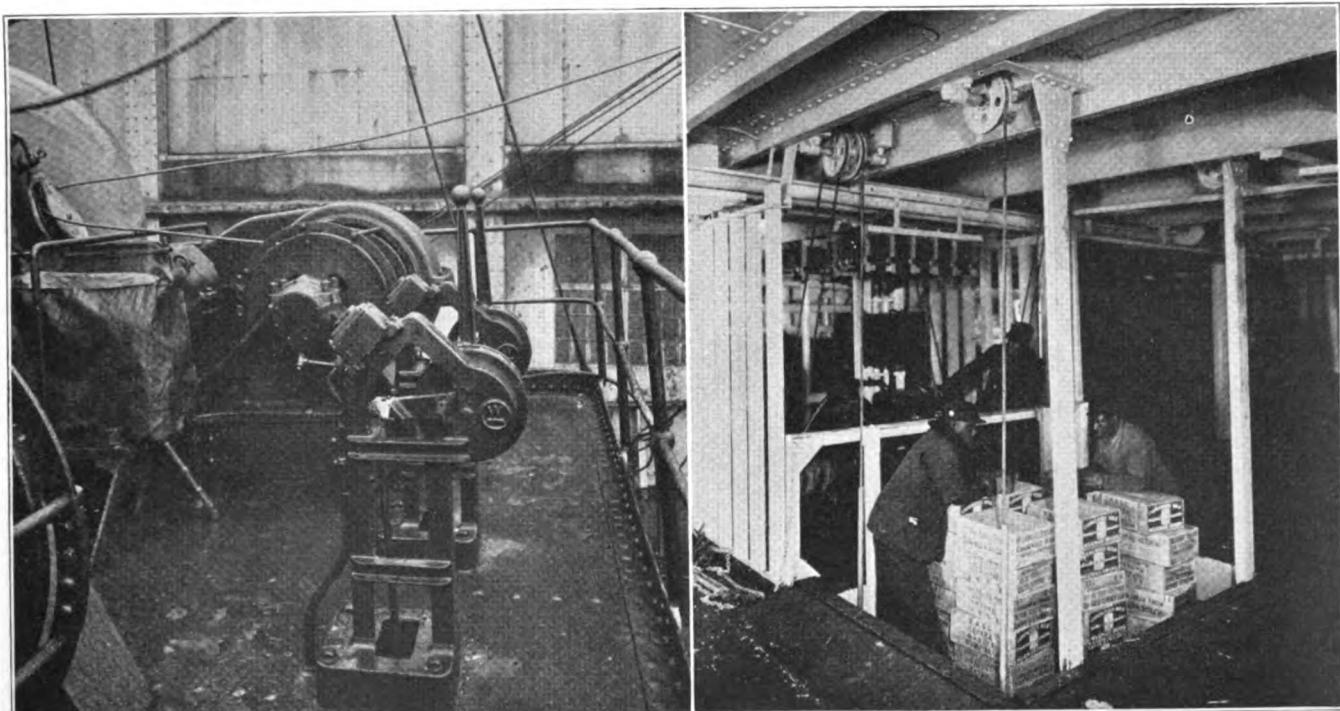
cating machinery are eliminated with consequent saving in maintenance and in lubricating oil used. The efficiency of electric motors is not affected by age. Electrical machinery is ready for instant use without necessity of warming up and draining cylinders.

The remote control of electric motors readily lends itself to the most advantageous location of machinery, irrespective of operator. In many ships the control is grouped at one point and the auxiliaries may be started, regulated or stopped by the operator at this point, or may, if the operator chooses, be also started or stopped from a point near or at the machine. Electrical machinery is convenient to install because of the ease with which cable can be run as compared to steam and exhaust pipes, with the necessary provisions for care in drainage. It is simple in operation and can be handled by operators with little preliminary training.

The power used by electric motors is easily checked through meters installed on the switchboard and gives a ready means for keeping records. Electric auxiliaries improve working and living conditions aboard ship because of quietness and cleanliness.

Reliable Deck Auxiliaries

Electric motor drive for boat hoists (reliability is all important here) and ventilating fans, for quarters below, has become standard practice. Steering gears are becoming so, even though other auxiliaries are not electrified, because of the great waste of steam in the steering gear engine and piping and the more advantage-



Left—Electric Cargo Winch Controls on S. S. Seminole. Right—Electric Cargo Elevator on S. S. Robert E. Lee

ous methods of electric control from the bridge. Cargo winches, capstans and windlasses have been electrified on many steamships and in every case have amply justified their installation.

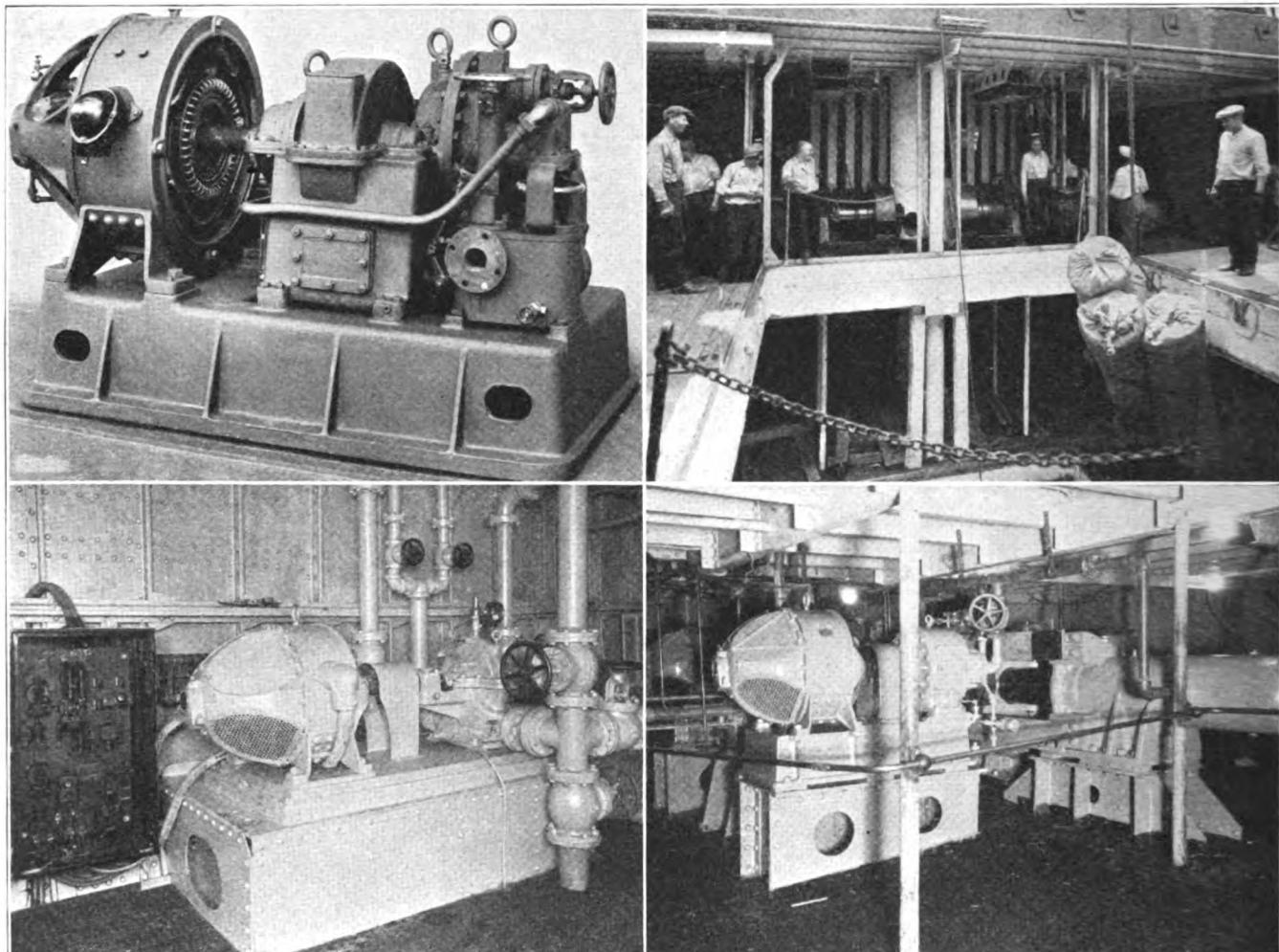
One operator of combined cargo and passenger steamships has reported that his vessel with electrically operated cargo handling equipment required in port only two of the four burners under one boiler, while a ship with all steam auxiliaries across the pier required all burners operating under two of the four boilers.

ger vessels, the port steam requirements for other auxiliaries were rather large, and there was no saving here as these auxiliaries were of the same steam driven types on the vessels compared.

It is worthwhile to note that however skeptical the operators of steamships who have installed electric auxiliaries may have been at first, experience with the electric auxiliaries has made them enthusiasts with the desire to further extend the electrification to other auxiliaries. Factors other than fuel economy have been

most advantageous position to the operator near the hatch. The controls for two winches can be so placed that one operator handles both where stevedoring rules permit. With electric winches there is only one control lever per winch, braking being taken care of automatically, this giving quicker and safer handling of cargo. Cable to electric deck auxiliaries can be more easily and more advantageously installed than can steam and exhaust piping.

For certain applications, especially where the machinery is only operated



UPPER LEFT—AUXILIARY TURBINE GENERATOR UNIT OF WESTINGHOUSE DESIGN. UPPER RIGHT—ELECTRIC WINCHES ON S. S. CHEROKEE. LOWER LEFT—ELECTRICALLY DRIVEN ENGINE ROOM PUMPS. LOWER RIGHT—ELECTRIC STEERING GEAR

In other words, the fuel consumed in port was in the ratio of 4 to 1 in favor of the vessel with electric auxiliaries. Two other operators, one in the coastwise trade where the stays in port are short and much of the cargo is trucked out from 'tween deck cargo spaces, and the other in foreign trade, have reported that their records showed overall fuel savings in port of from 20 per cent to 25 per cent in favor of the vessels with electrically operated cargo winches and other deck machinery. Incidentally, in these two cases, which were combination cargo and passen-

genger vessels, the port steam requirements for other auxiliaries were rather large, and there was no saving here as these auxiliaries were of the same steam driven types on the vessels compared.

Electric winches can be located wherever most convenient and the control stand can be installed at the

occasionally and steam pipes must be run for other purposes, the use of steam auxiliaries will probably continue. But in almost every other kind of service, electric auxiliaries have proved themselves to be more economical, convenient and satisfactory. As is shown by the increasing number of steamships equipped with them, ship owners, marine architects and operating engineers are generally recognizing the value of electric auxiliaries; and it is undoubtedly only a matter of time before electric auxiliaries will be as commonly used on steamships as on motorships.

Readers Are Impressed by Fiftieth Anniversary Number

THE July number of MARINE REVIEW commemorating the fiftieth anniversary of its founding presents a resume of the history, progress and development of the marine industry during this period. The Penton Publishing Co., publisher of MARINE REVIEW, spared no effort to make this issue worthy of the occasion, in substance, arrangement and in the quality of its physical make-up. The final judgment on the success attained rests with our readers. It is therefore particularly gratifying to learn, through many letters received by the editor, of its generous reception. Some of these comments, which are of general interest, are published herewith.

J. C. Evans

President, Great Lakes Transit Corp.

I WANT to compliment your company on its July number of the MARINE REVIEW being your fiftieth anniversary number. As an enthusiastic subscriber of the MARINE REVIEW for many years I have taken great pleasure in reading this wonderful anniversary number. The articles by my friends T. V. O'Connor, Prof. Herbert C. Sadler and Harry Coulby, and the article about Frank E. Kirby I found unusually interesting.

The tribute that you paid on page 105 to two big noble lake men, the late Harvey D. Goulder and the late Alfred G. Smith, are so well written, good pictures of them.

The pictures that you show of notable men in marine affairs, makers of maritime history on pages 90 and 91 bring back to my mind many men that I knew so well and admired for their genius and ability. You should all be very proud of this number.

T. V. O'Connor

Chairman, United States Shipping Board

A COPY of the fiftieth anniversary number of MARINE REVIEW lies before me, together with your letter of July 7. Your thoughtfulness is greatly appreciated.

I scarcely know how to express my admiration for your anniversary number, which strikes me as very fine indeed, not only in the character of material presented, but also in the way in which that material is displayed. As a usual thing one expects to find

a good deal of "padding" in special issues and anniversary numbers. In this case, however, the various articles, prepared by men who stand at the head of their respective professions, are exceptionally informative and timely. What could be better, for example, than Capt. Walter McFarland's sketch of the development of marine propulsive machinery during the past half-century? For the general reader this admirable paper, written by one of the ablest men ever graduated from Annapolis, is better than an entire library devoted to the subject of marine engineering.

But it is perhaps unfair to single out any particular article for special mention when all of them—at least all that I have so far had an opportunity of examining—are so interesting. I shall want to keep this number close at hand for frequent future reference.

Let me say in conclusion that in my opinion the most gratifying feature of the entire production is your ringing editorial declaration for a real American merchant marine. I like the strong, dignified, and unmistakable language in which this attitude is expressed. It puts the finishing touch to a great anniversary number.

Permit me to extend to yourself and the entire editorial staff of the MARINE REVIEW my heartiest congratulations on this splendid piece of work.

Gen. A. C. Dalton

Vice President and General Manager U. S. Shipping Board, Merchant Fleet Corp.

I AM pleased indeed to have yours of July 7 and your July number of MARINE REVIEW. I regret exceedingly that I was unable to give you the article requested, and assure you that it was only due to my absence from the city on that particular date.

I want to compliment you upon the appearance of your magazine and, not only upon the appearance of it, but upon the educational features and mass of information contained therein.

S. D. McComb

President S. D. McComb & Co. Inc.

THIS will acknowledge receipt of your letter of July 6. I want to congratulate you on your fiftieth an-

niversary. The fact that you have gone along for fifty years shows the value of your paper, and I believe it is improving all the time. We always look it over with great interest.

B. V. E. Nordberg

Executive Engineer, Nordberg Mfg. Co.

UPON my return to Milwaukee I find your esteemed favor of July 7. I have also received the copy of the July fiftieth anniversary number of the MARINE REVIEW. I have seldom looked over an issue of any publication with more interest, for in it I find expressions on shipping news and events by men with whom I have personally come in contact, and whose word means a great deal to any one interested in shipping. It is evident that a great deal of effort has been put into this number and you are to be greatly congratulated on the work you have done.

John G. Munson

President Bradley Transportation Co.

I GREATLY appreciate the fiftieth anniversary copy of MARINE REVIEW and wish to compliment you on this very fine issue.

J. B. Crowley

Assistant to President American Bureau

LET me congratulate you on the fiftieth anniversary number of your publication. The whole thing is a very interesting and handsomely gotten up project.

There is one noticeable omission, however, that I thought I would mention, and that is the absence of Commander Stevenson Taylor's picture from the groups on pages 90 and 91. I am sure that this was an unintentional oversight, as unquestionably you will agree with me that he was of the notable men in marine affairs.

Capt. R. D. Gatewood

Manager, Maintenance & Repair Division U. S. Shipping Board, Merchant Fleet Corp.

I VERY much appreciate your kindness in sending me a copy of the fiftieth anniversary number of MARINE REVIEW.

I desire to congratulate you on the fine way that this is gotten up, and the success and value of your publication.

Orders Third Electric Liner at Newport News

P. A. S. Franklin, president of the International Mercantile Marine Co., announced July 6 that a contract had been signed on July 5 with the Newport News Shipbuilding and Dry Dock Co. for the construction of a new turbo-electric liner for the Panama Pacific line, operating between New York and Los Angeles and San Francisco via Havana and the Panama canal. She will be the largest

and finest vessel ever built in America and will be ready for service in December, 1929.

This third addition to the Panama Pacific line, a sister ship of the VIRGINIA, which will be launched Aug. 18, will be 612 feet long, 82 feet beam and will have a displacement of 35,000 tons.

Mr. Franklin said that the popularity of the CALIFORNIA, which has been in service only five months, has already demonstrated conclusively the advisability of increasing this high

class tonnage of the Panama Pacific line. He said he hoped eventually to have six deluxe turbo-electric liners operating between the Atlantic and Pacific coast ports via the canal with weekly sailings from New York and San Francisco.

"It is an extensive program," said Mr. Franklin, "and we need encouragement. Much has been said in support of American shipping and the maintenance of the American flag on the sea. The opportunity is now at hand to support such patriotic sentiment and encourage our efforts."

Santa Maria Completes Maiden Voyage

REPORTS indicate that the new Grace twin screw motor liner SANTA MARIA gave an entirely creditable performance on her first round voyage completed on June 25. This vessel is the largest passenger motor ship flying the American flag and the first to be placed in service between the United States and South America. On her first voyage she carried a capacity passenger list both north and south bound. The troublesome question of vibration seems to have been entirely solved by the English engineers who designed this vessel. By studied attention to periods of vibration of the engine and by strengthening and reinforcing the

after part of the ship vibration has been eliminated.

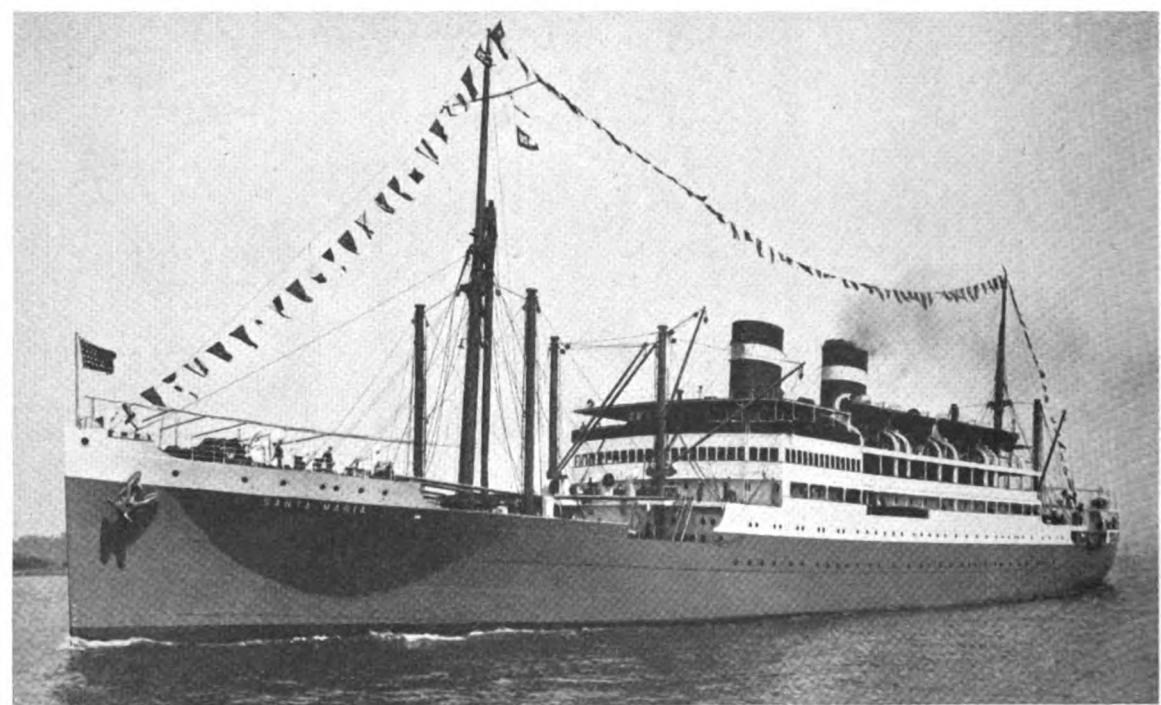
The sailing schedule required calls at 14 ports south bound and 12 north bound not including New York. The schedule was maintained perfectly without difficulty and the vessel averaged a speed of 16.4 knots for the entire voyage. The ventilation of the vessel proved entirely satisfactory in staterooms, public rooms, and in all parts of the vessel. Excellent service was given by the system of electric winches in the handling of cargo. One feature is the quietness with which these winches run causing no disturbance to passengers while in operation. Electricity has also been applied to

heating and cooking with excellent results. The laundry is also operated electrically.

Latest Navigating Equipment

The latest navigating equipment is installed including a Sperry gyroscopic compass with course recorder and steering and bearing repeaters and a repeater for direction finding. There is also a gyro pilot of the two unit type in which the after unit electrically controlled from the bridge operates the control valve of the steering gear. The ship can thus be steered automatically on any course desired.

The SANTA MARIA now in service between New York via Panama canal to Peruvian and Chilean ports on the



Twin Screw Motor Liner Santa Maria Built for Grace Line by Furness Shipbuilding Co. Ltd.

West coast of South America and her sister ship the SANTA BARBARA now about completed were built for the Grace Steamship Co. by the Furness Shipbuilding Co. Ltd., England. Though built abroad these vessels fly the American flag. Accommodations are provided for first class passengers only, to the number of 170, in single and two-berth cabins. Quarters are arranged on five decks. There are a number of special suites-de-luxe. A large number of the rooms have private baths.

In general the vessel is of the two-deck type with a complete shelter deck with tonnage opening aft. Above the shelter deck are respectively the bridge, forecastle, promenade, boat and sun decks. These vessels are 486 feet in length overall; 64 feet in beam; and 25 feet 5 inches in depth. The gross tonnage is about 9000 while the deadweight capacity is about 7000 tons. In addition, to refrigerating space for the ship's own use there are six special insulated cargo spaces ar-

ranged to carry fruit and other perishable produce. The refrigerating machinery is of the CO₂ type electrically driven, made by J. & E. Hall Ltd. The Lux-Rich system has been fitted for detecting and extinguishing fire in cargo spaces.

Very Attractive Furnishings

The arrangement and furnishings of cabins and decoration and furnishing of all public rooms have been carried out in an excellent manner. Most of the public rooms including the social hall, lounge, smoke room and veranda cafe are located on the promenade deck. This deck is fitted with a glass screen making an open air lounge at the fore end. There is a second veranda cafe and additional deck space on the boat deck which in turn is covered by a special sun deck.

Propulsive power is furnished by two eight-cylinder, two stroke cycle, single acting Sulzer diesel engines of standard design. The shipbuilder carried out the whole machinery installa-

tion as well as all electrical auxiliary machinery. The main engines each develop 4000 brake horsepower at 100 revolutions per minute. The cylinder bore being 680 m.m. and the stroke 1200 m.m. The control station is at the forward end of each engine. The tandem three-stage injection air compressors are driven by cranks at the fore end of the main crankshafts.

For supplying electrical current to the auxiliaries there are four 270-kilowatt 320-volt diesel generator sets driven by 400 brake horsepower at 200 revolutions per minute four cylinder two stroke Sulzer heavy oil engines with cylinders 340 m.m. in diameter by 540 m.m. stroke.

All in all these two vessels are of great interest to the marine engineer and to steamship owners and operators. Their performance will be keenly observed, with the view of establishing definitely the superiority of this type of machinery in the run and the type of vessel represented.

Sir John Thornycroft — 1843-1928

THE well-known naval architect and engineer, Sir John Isaac Thornycroft, died at his home in the Isle of Wight on June 28 at the age of 85.

Both his father and mother followed the art of sculpture, Mrs. Mary Thornycroft having herself inherited the talent from her father, John Francis. It was while they were studying in Rome that their son, John Isaac, was born in 1843. His father encouraged his mechanical bent, and at the age of 17, John Thornycroft built from his own designs, in his father's house, an iron steam launch called NAUTILUS, which was 36 feet long by 5 feet 10 inches beam. He launched it on the Regent's Park canal, in London, and it was subsequently tried out on the Thames, where it kept pace with the fastest racing eights on the river. Previously young Thornycroft had built a model boat, the ANNIE, in which he anticipated principles of design which he applied later on to the construction of fast launches and torpedo boats.

The origin of the Thornycroft works dates back to 1864, when Thornycroft, then 21 years of age, established a works at Chiswick, London, where he began to build small launches. He then spent some time at the yards of Palmer's Shipbuilding Co., at Jarrow, and subsequently he studied engineering and mathematics at the University of Glasgow, under Sir William Thompson (Lord Kelvin) and Professor

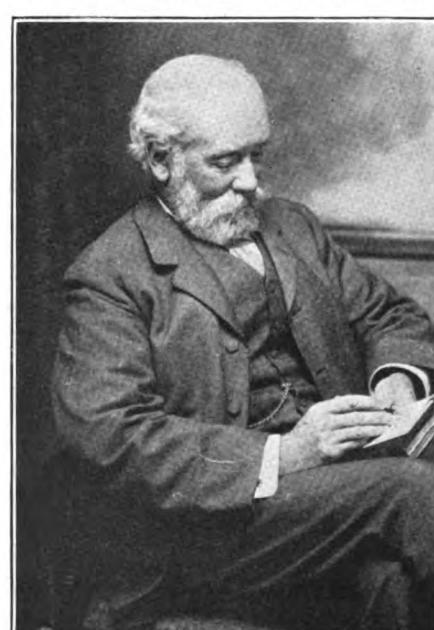
Rankine. Having completed his studies he returned to Chiswick and built the MIRANDA, which he fitted with a locomotive boiler and which reached the speed of 18½ miles per hour, which never had been attained previously.

This feat became known and estab-

speeds, and he found that he had reached the limit which could be obtained with locomotive boilers. He then designed the now famous Thornycroft watertube boiler, which was first applied by the Danish and British admiralties. Gradually the Thornycroft yard built torpedo boats and destroyers, and the works attained the present-day dimensions.

Thornycroft's activities were not limited to the construction of vessels, but in association with his sons he also built steam lorries, and then ventured on the construction of motor driven commercial and touring cars. Throughout the life of the founder the Thornycroft works continued to build power boats and hydroplanes.

John Isaac Thornycroft was knighted in 1902. He was a doctor of laws and a fellow of the Royal Society, and contributed many papers to the British association, the Institution of Naval Architects, of which he was a vice president, and the Institution of Civil Engineers. It is interesting to note that the sculptured figure of Boadicea in her chariot, which stands on Westminster bridge in London, was the work of his father, Thomas Thornycroft, and was presented to the public by Sir John. His eldest son, Sir John Edward Thornycroft, is managing director of the firm.



Elliott & Fry Ltd.
SIR JOHN ISAAC THORNYCROFT

lished Thornycroft's reputation, and his yard at Chiswick underwent considerable changes and extension. He built boats which attained yet greater

Late Decisions in Maritime Law

Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review

By Harry Bowne Skillman

Attorney at Law

THE situation of an anchored vessel may be such as to subject her to the duty of maintaining a competent anchor watch, ready to give her chain and sheer her clear of an approaching vessel, or to adopt other suitable measures to avoid a threatened collision, though the danger was created by the fault of the other vessel.—*Cuyamel Fruit Co. v. Nederland*, 19 F. (2d) 489.

* * *

THE phrase 'perils of the sea' does not vary in meaning according to the size or type of vessel. The owner of a vessel impliedly warrants its seaworthiness. Any vessel, whatever its size or type, to be seaworthy must be able to withstand the ordinary perils of a voyage at sea. A vessel is unseaworthy that does not measure up to this minimum requirement.”—*Fireman's Fund. Ins. Co. v Compania de Navegacion, Interior S. A.*, 19 F. (2d) 493.

* * *

WHERE the alleged failure of a master to give a seaman necessary medical attention necessitated a subsequent surgical operation at an American port, where all the witnesses resided, a suit brought by a foreign seaman against a ship of his own nationality should be considered as coming within the exception to the rule that jurisdiction will not ordinarily be exercised of such cases, because a hardship might otherwise be unjustly imposed on the seaman.—*SNELAND I*, 19 F. (2d) 528.

* * *

THE Argentine law is the same as the law of the United States and England; that is, that an indorsee of a bill of lading incorporating the provisions of the charter party has the benefit only of those provisions of the charter which relate to the cargo, and therefore cannot resort to a lesser clause in the charter party to avoid liability for demurrage.—*Yone Suzuki & Co. v. Central Argentine Ry.*, 19 F. (2d) 645.

* * *

A STEAMER when passing a tow in a channel was bound to use the care with reference to her speed which as experienced men those in charge of her should have known was required. In the case of *LUKE*, 19 F. (2d) 923, a speed of 12 knots in passing a tow 350 feet off, with shoal water just beyond the channel's edge, was held excessive.

* * *

A CARRYING barge, with the tug which tows her, form a unit, and as such are to be deemed, for the purpose of the Harter act, a carrier within its benefits, and the tug is not

liable for negligence consisting of errors of navigation. "There is now no distinction in respect to exemption from liability between a carrier supplied with her own motive power and one the motive power of which is supplied by a tug," it was declared in the case of *BATHGATE*, 19 F. (2d) 663.

* * *

SUM of \$10,748, awarded as damages for causing the death of a fisherman, was held, in the case of *ALBATROSS*, 20 F. (2d) 17, not excessive, it appearing that the deceased was 47 years old, earned on an average of \$2132 annually, left surviving him a widow and four children, of from 3 to 10 years of age, had a life expectancy of 23.8 years, worked steadily, was in good health and not disabled by occupation, and sent or brought all pay checks home.

* * *

A VESSEL, seeking the services of a towboat, holds itself out to be sufficiently staunch and strong—that is, seaworthy—to withstand ordinary perils of the sea to be anticipated on a voyage; and a tug has also the right to assume that the tow will carry a competent and sufficient crew, and is not liable for dangers, either from the unseaworthy condition of the barge or for the failure of its owners to properly man and equip the same. The tug is not an insurer of the safety of the tow, nor is there imposed upon it the obligation of a common carrier; but it is charged with the duty of exercising reasonable and ordinary care for the protection and safe-keeping of the tow intrusted to it, and should faithfully and diligently discharge its undertaking, omitting nothing that could reasonably be required of it that would tend to lessen hazards and dangers to the tow.—*Southgate v. Eastern Transportation Co.*, 21 F. (2d) 47.

* * *

WHERE a ship delivered a shipment of merchandise to the buyer without requiring surrender of the bill of lading, contrary to its provisions, there was a nondelivery of the entire consignment, for which, under another provision, neither the carrier nor the ship was liable, unless given notice within ten days of discharge.—*Lake GAITHER*, 21 F. (2d) 83.

* * *

WHERE two vessels, coming from opposite directions, are meeting head on, or nearly so, in a channel of sufficient width to give clearance, with no risk of grounding, the port to port passing is the normal and proper method of navigation, and one vessel is not entitled to assume that another will pass her starboard

to starboard until two whistles have not only been blown, but answered. And, if they are approaching each other as much as 1½ to 2 points, they are to be considered as head and head, it was declared in the case of *SABINE SUN*, 21 F. (2d) 121, and bound to pass port to port under the rule.

* * *

UNDERLYING every contract of affreighting there is an implied absolute warranty of seaworthiness, and the exercise of due diligence to make a ship seaworthy does not absolve the owner from his absolute obligation to furnish a seaworthy vessel, unless he unequivocally so contracts.—*W. T. Lockett Co. v. Cunard Steamship Co.*, 21 F. (2d) 191.

* * *

THOUGH a vessel be not engaged in navigation, carrying freight or passengers, it is within the admiralty jurisdiction, and is subject to maritime liens, if it is capable of being navigated, by its own power or by towing, and its business or use requires it to be navigated from one place to another. This rule was applied by the court in the case of *PIRATE SHIP*, 21 F. (2d) 231, and it was held that a 600-ton barge, from which the motive machinery had been removed, and which was used as a dancing pavilion, but within six months had been moved and moored to three different wharves, was subject to maritime liens for repairs, wages, supplies, and wharfage.

* * *

PLACING of a lookout approximately 150 feet back of the bow of a vessel proceeding in a thick general fog or mist, with occasional rain, where and when it was impossible to see beyond perhaps less than 100 feet in any direction, constituted gross negligence, it was decided in the case of *CAMPANIA*, 21 F. (2d) 233. "The authorities," declared the court, "seem to coincide in the opinion that, where the range of visibility is diminished by inclement weather, as by fog, rain, or mists, or dashing spray, where the ship is in motion, or during dark or cloudy nights, the proper place for the lookout is at the bow, at the extreme forward end of the ship, or as it is generally expressed 'in the eyes of the ship.'"

* * *

IN CONTEMPLATION of law, a voyage of a vessel is the sailing or passage or transit of a ship from her port of origin to her port of destination. The voyage ends, according to *PELOTAS*, 21 F. (2d) 236, when the vessel is safely moored at her port of final destination and is ready for unloading.

Marine Business Statistics Condensed

Record of Traffic at Principal American Ports for Past Year

New York

Month	(Exclusive of Domestic)			
	—Entrances—		—Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1928	537	2,386,509	602	2,465,954
May	580	2,498,280	590	2,463,196
April	566	2,487,959	541	2,359,979
March	548	2,338,855	578	2,449,705
February	513	2,205,204	501	2,135,910
January	540	2,160,576	512	2,146,026
December	436	1,770,164	548	2,222,409
November	543	2,243,752	474	2,069,106
October	485	2,105,364	531	2,221,372
September, 1927	498	2,153,701	565	2,428,200

Philadelphia

Month	(Including Chester, Wilmington and the whole Philadelphia port district)			
	(Exclusive of Domestic)		(Exclusive of Domestic)	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1928	101	270,069	72	183,534
May	110	281,648	74	179,108
April	109	261,735	60	140,547
March	95	254,304	65	167,100
February	88	239,768	53	152,545
January	81	206,710	54	141,408
December	81	206,171	42	108,935
November	78	193,676	43	99,965
October	94	211,988	63	136,871
September, 1927	77	183,481	50	95,898

Boston

Month	(Exclusive of Domestic)			
	—Entrances—		—Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1928	148	319,611	100	254,906
May	134	204,575	103	231,851
April	110	343,860	65	205,257
March	108	348,026	67	194,408
February	100	301,053	50	160,330
January	102	328,779	61	197,133
December	91	255,980	52	169,150
November	98	320,340	63	178,707
October	107	380,655	69	244,265
September, 1927	114	375,509	83	248,244

Portland, Me.

Month	(Exclusive of Domestic)			
	—Entrances—		—Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1928	30	40,255	25	38,834
May	23	26,648	19	28,673
April	20	51,854	19	50,175
March	20	58,110	22	63,400
February	18	44,067	17	47,032
January	21	57,757	18	48,294
December	23	50,380	23	55,280
November	25	42,291	26	40,248
October	32	60,920	35	71,587
September, 1927	32	68,688	32	61,227

Providence

Month	(Exclusive of Domestic)			
	—Entrances—		—Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1928	8	85,177	7	25,741
May	7	21,068	4	12,765
April	4	15,670	3	12,362
March	7	27,885	6	26,037
February	3	6,656	4	17,543
January	4	20,931	4	18,817
December	4	11,618	5	21,125
November	4	16,374	2	9,920
October	7	24,736	1	2,875
September	4	12,240	4	14,109

Portland, Oreg.

Month	(Exclusive of Domestic)			
	—Entrances—		—Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1928	23	85,828	40	144,572
May	25	96,976	44	159,070
April	37	137,821	41	152,042
March	29	111,490	49	170,655
February	28	86,160	35	120,026
January	37	130,578	50	188,254
December	34	134,562	61	228,472
November	38	141,747	70	247,571
October	57	208,738	70	254,270
September, 1927	69	211,182	79	291,920

Note: The figures given in this table are for direct entrances and clearances. Additional vessels in foreign trade enter and clear from and to other American ports after original entry and before final departure. At the port of Philadelphia, for instance, additional vessels in the foreign trade in this category were 52 of 182,801 net tons and 59 of 199,820 net tons cleared for the month of April.

Baltimore

Month	(Exclusive of Domestic)			
	—Entrances—		—Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1928	127	392,580	135	412,620
May	135	413,083	151	439,278
April	140	396,942	134	394,124
March	128	391,117	137	408,927
February	134	412,110	135	399,729
January	116	354,307	120	374,617
December	129	406,889	132	398,587
November	103	330,488	110	323,666
October	118	365,876	116	350,509
September, 1927	116	355,924	130	402,528

New Orleans

Month	(Exclusive of Domestic)			
	—Entrances—		—Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1928	253	615,672	263	640,136
May	263	671,333	261	647,504
April	254	656,537	265	666,345
March	265	669,301	282	720,407
February	238	627,445	236	616,772
January	271	725,985	272	697,801
December	240	671,775	258	714,455
November	226	586,013	236	609,299
October	260	698,720	265	710,922
September, 1927	232	613,772	240	632,593

Norfolk and Newport News

Month	(Exclusive of Domestic)			
	—Entrances—		—Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1928	19	42,454	63	155,944
May	25	58,472	78	207,857
April	15	35,122	81	189,564
March	18	39,102	89	209,171
February	13	32,925	77	206,630
January	14	29,831	75	202,997
December	17	35,439	78	207,636
November	23	51,726	78	206,978
October	25	65,640	77	214,940
September	26	67,249	87	240,899

Charleston

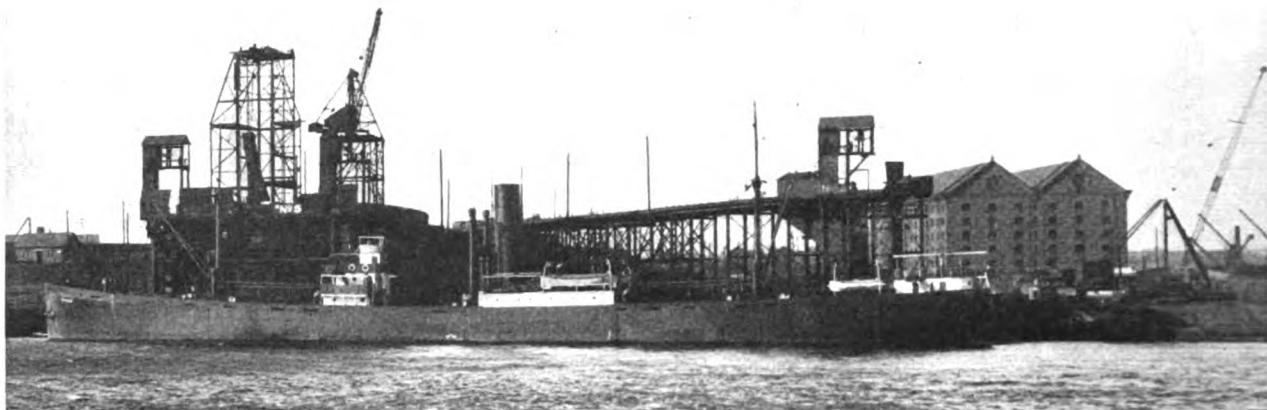
Month	(Exclusive of Domestic)			
	—Entrances—		—Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
May, 1928	29	71,467	32	78,781
April	26	60,165	21	52,590
March	29	79,789	27	67,472
February	26	74,244	27	73,168
January	32	83,419	52	150,260
December	27	65,379	25	63,354
November	32	77,911	33	81,978
October	37	95,473	36	95,070
September	39	102,374	39	101,044
August, 1927	39	108,022	35	92,227

Galveston

Month	(Exclusive of Domestic)			
	—Entrances—		—Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
June, 1928	20	52,884	64	210,110
May	35	96,852	44	126,027
April	32	85,685	43	132,534
March	35	75,924	47	121,106
February	27	63,696	52	147,378

Dock Management Progress Section

How Successful Dock Operators Have Met
Problems of Giving Best Service to Ships



Tyne Improvement Commissioners No. 5 Staith Showing Anti Coal Breaker

Trade and Facilities, River Tyne Advanced by Energetic Development

By Richard Aughton

THE port of Newcastle-upon-Tyne on the Northeast coast of England ranks today as one of the principal ports in the country by virtue of the volume of its trade and the variety of its shipping. The number of vessels (excluding tugs and fishing vessels) which used the port during the year 1927 was 9633 with a total net registered tonnage of 10,616,555.

The great modern era of this, the most important waterway on the Northeast coast, dates from the year 1850 when parliament called into being the Tyne Improvement commission. This body, which constitutes the port authority, has for over 75 years worked with tireless persistence to develop and maintain this important center of commerce and industry.

To quote the eloquent words of R. W. Johnson, the author of the *Making of the Tyne*—"Its tidal flow,

This article was prepared for MARINE REVIEW by the author, Richard Aughton, general manager of the Tyne Improvement commission.

no less than its busy banks, its expansive docks, its magnificent piers, are the handiwork of a generation of Tynesiders who have snatched a port from the North sea and converted what was little better than a ditch into a great river."

The river, which is the main artery for the counties of Northumberland and Durham, serves a population of approximately 3,000,000 people. The Tyne is now practically one huge dock, over 15 miles long, surrounded by numerous and important industries, and its docks, wharves, coal shipping staiths, etc. are found from one end of the river to the other.

Dredging—Depth of Water

As the size and draft of ships have gradually increased during the last fifty years, so has the river been deepened and improved until today it is capable of safely floating the largest ocean liners and battleships. Tynesiders now living remember a time when there was less

than seven feet of water on the bar at low water. Today two magnificent breakwaters mark the entrance to the port and make it a veritable harbor of refuge for vessels in all weathers.

It was nature's rich legacy of coal in the counties of Northumberland and Durham which laid the foundation of the industrial prosperity of the Tyne. The oldest coal port in Great Britain—a charter to mine coal in Newcastle having been granted by Henry III in 1245—the Tyne has today become the greatest coal exporting district on the East coast of Great Britain, and has earned the reputation of being one of the cheapest and most expeditious bunkering ports in the kingdom.

There is a varied choice of excellent and relatively cheap coal from Durham and Northumberland collieries, which have the natural advantage of being within easy distance from the river. The record shipment of coal from the port was in 1923, when

21,553,964 tons were exported.

Coal shipping staiths are found from one end of the port to the other, there being in all 71 coal shipping berths, many of them in the river, where the necessity of docking and undocking is obviated. At the commissioners' Whitehill point river staiths large vessels can take in full cargoes and/or bunkers and proceed direct to sea at almost any state of the tide. Three of the five berths at Whitehill point are fitted with hydraulic lifts capable of lifting high capacity wagons to an approximate height of 70 to 80 feet above low water ordinary stages of the tide. All of the commissioners' berths at Whitehill point and Albert Edward dock are fitted with electric coal band conveyors. At No. 5 berth, Whitehill point, there is an anti-coal breakage appliance. Large cargoes of coke for the Pacific coast have been dealt with by this appliance and the shippers have received reports of the excellent condition of the coke on arrival in America.

Varied Tyneside Industries

The Tyne is not only a coal exporting river, it is the center of a tremendous and varied industrial activity. The other staple industries are shipbuilding and engineering, and the following list indicates the varied character of the industries now carried on:—shipbuilding; shiprepair-

ing; iron and steel manufactories; engineering and boilermaking shops; blast furnaces; ordnance works; lead works; copper works; chemical manufactories; cement manufactories; brick works; paint and color works; chemical manure works; timber yards and saw mills; creosoting works; corn and flour mills; hemp and wire rope works; grindstone manufactories; potteries; and fishing.

The manufacture of marine turbine engines, locomotives and electrical apparatus form important branches of the many industries to be found on Tyneside. Following on the war, the great Scotswood shell shops were converted into locomotive works.

Imports and Exports

The Tyne is well served by regular steamship lines—coastwise and continental—as well as to and from the four quarters of the globe, including Canada, the United States, South America, the Pacific and a wide range of European and Mediterranean ports. Ocean liners up to 500 feet in length are regularly berthed at Newcastle quay, which is the distributing center for the import traffic in provisions, fruit, foodstuffs, etc., not only for the Newcastle district, but for a much larger area. General merchandise is also dealt with at Tyne dock, Northumberland dock and Albert Edward dock.

The chief general imports to the

port are iron ore, grain, timber, provisions, fruit and vegetables, cement, sulphur ore, etc., oil fuel, wood pulp, phosphates and paper.

The leading exports are pig iron, chemicals, firebricks, machinery, locomotives, lead goods, tar, pitch and resin.

Large modern flour mills with a deep water berth and electric discharging elevators are found at Duns ton, the grain silos having a storage capacity of about 20,000 tons. These mills are capable of turning out per week 12,000 sacks of flour of 280 pounds each and also about 600 tons of wheat offals. Grain is also discharged at Tyne dock, Albert Edward dock and Newcastle quay.

Great developments have taken place in the oil bunkering business during recent years. There are now three large oil installations in the port with deep water berths alongside for the discharge of or bunkering of vessels. Tank capacity is provided for the storage of about 55,000 tons of fuel oil. Two self-propelled oil tankers of 500 and 250 tons capacity respectively, have been provided by the oil companies for bunkering vessels with oil fuel in any part of the port.

Shipbuilding and Engineering

The Tyne is famous for its shipbuilding yards, which are world renowned. With the exception of the Clyde, it has the largest output of



Loading Locomotives at the Elswick Wharf of Sir W. G. Armstrong, Whitworth & Co. Ltd.

the United Kingdom. Some of the largest ocean liners, battleships and floating docks have been built on Tyneside. The engineering firms on the Tyne are ranked among the most important makers of naval and merchant ship machinery in the world.

By virtue of its geographical situation on the North sea, with the advantage of outward coal freights and cheap bunker coal, the Tyne is a most attractive port for ship repairing. Thirty years ago, though there were numerous slipways, there were only ten dry docks on the river, most of them of comparatively small

several private shipbuilding and dry docking establishments, was responsible for refitting no fewer than 2750 naval vessels, besides repairing a much greater number of torpedoed and war damaged merchant vessels of all types.

There are three 150-ton cranes on the River Tyne belonging to the undermentioned companies at the following quays, viz.: Elswick: Vickers, Armstrongs Ltd.; Wallsend: North Eastern Marine Engineering Co., Ltd.; Wallsend Slipway and Engineering Co. Ltd.

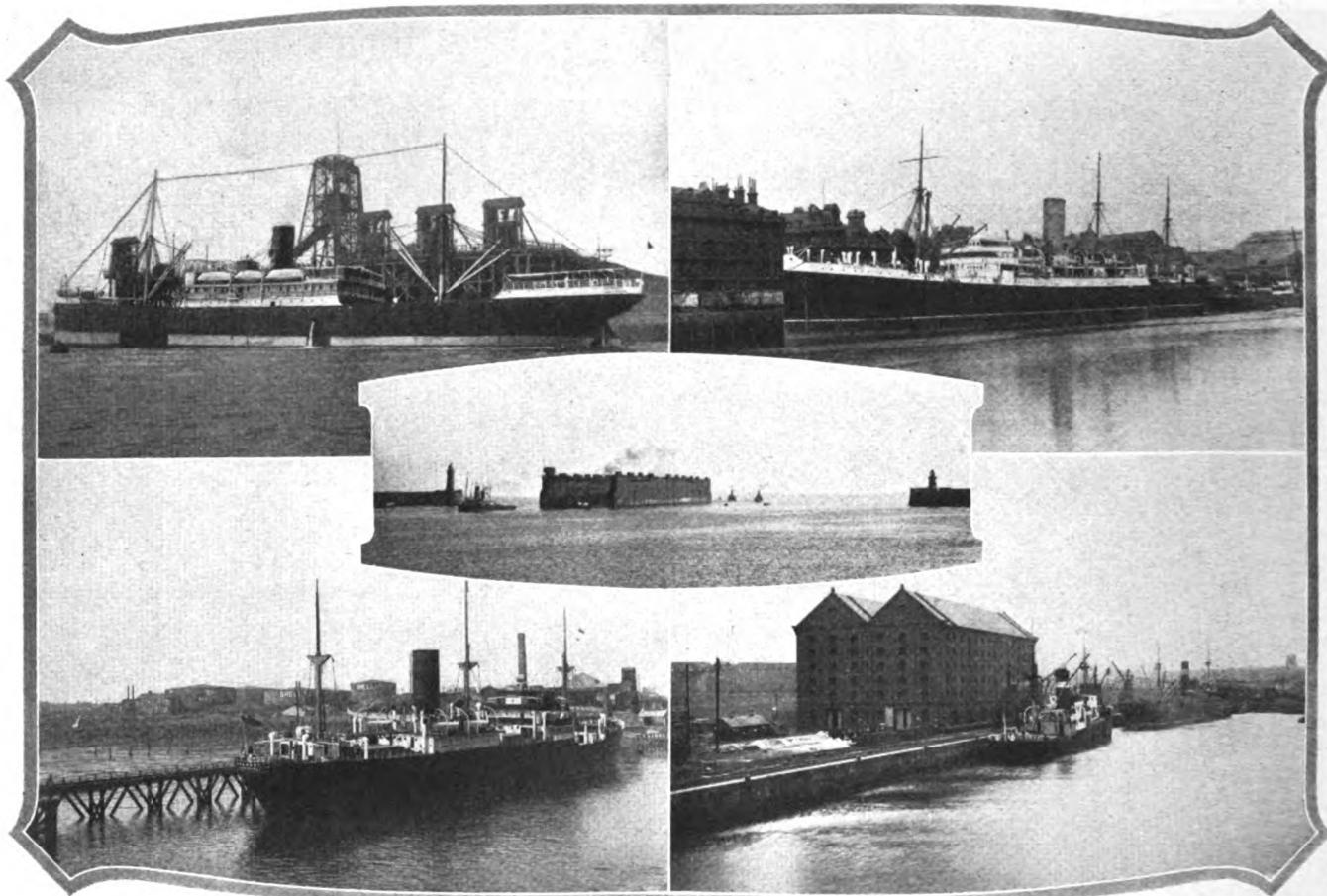
Swan, Hunter and Wigham Rich-

ardson, Ltd., also have a 150-ton floating crane (TITAN 11) which is hired out for general use in the port at tariff rates.

have been brought down to the pre-war figures. In some cases the dues are actually below the prewar tariff. Liberal rebates are granted on vessels calling in the port and loading or discharging part cargoes; in fact no port in the country offers more inducement to shipowners in this respect than the Tyne for the development of general cargo traffic.

Broadly speaking, the dues are based upon the quantity of cargo carried and only to a small extent on the tonnage of the vessel.

The Tyne Improvement commission as the port authority, and a body



Upper Left—Vessel Loading Coal at No. 5 River Staith, Whitehill Point. Upper Right—Large Steamer Discharging at Newcastle Quay. Center—World's Largest Floating Dock Leaving the Tyne for Southampton. Lower Left—Oil Storage of Shell-Mexican Ltd. and British Petroleum Co. Ltd. at Yarrow Slake. Lower Right—Tyne Improvement Commissioners' Grain Warehouse and Quay, Albert Edward Docks

dimensions; today, there are no fewer than 35 dry docks and 19 slipways, many of the former capable of accommodating large vessels, one up to 700 feet in length.

During the war the splendid repairing facilities of the river were invaluable to the navy and the mercantile marine. The great admiralty floating dock, which had previously been built on Tyneside, was transferred from Sheerness to the Tyne, and once installed there, crippled battle hips and cruisers from the North sea fleet kept it busy until the war ended. This dock, together with the

ardson, Ltd., also have a 150-ton floating crane (TITAN 11) which is hired out for general use in the port at tariff rates.

Port Dues Are Reasonable

One of the most attractive features of the port is cheap dues. These have been reduced generally to 50 per cent above prewar rates, but the average increase on all dues is now only 26 per cent above prewar level. In the case of the inward river dues on goods and the not-breaking-bulk dues on vessels calling in the port for bunkers or drydocking, the dues

representative of all the trade and municipal interests on Tyneside, are fully alive to the requirements of the port and can be relied upon to do everything possible for the development of its facilities.

Anticipating the expansion of trade at Newcastle quay and in order to provide for the rapid increase of the number of large vessels using the port, the commissioners have recently provided a swinging area, with a depth of water of 25 feet at low water ordinary stage tide or 40 feet at high water ordinary stage tide, for vessels up to 450 feet in

length, at Tyne main, in close proximity to the Newcastle quay.

Another interesting development, nearing completion, is the construction at the Albert Edward dock, North Shields, of a deep water riverside quay 1100 feet in length, with all the necessary equipment mainly for the use of the Norwegian mail passenger and general cargo steamers. The quay is of reinforced concrete and will carry electric traveling cranes and a hydraulic coal hoist. The depth of water alongside the new quay will ultimately be 30 feet at low water ordinary spring tides. A transit shed 500 feet in length is to be provided with a passenger station at the rear thereof and the quay was officially opened by Sir William J. Noble, Bart., chairman of the Tyne improvement commission on June 15.

New Industries on Tyneside

With the object of attracting new industries to Tyneside and developing existing industries, the Tyneside Industrial Development conference consisting of representatives of all the corporations, urban district councils and public bodies on Tyneside was recently formed. The conference after exploring the whole position decided to embark upon an intensive advertising campaign for which a local public fund was raised. Attractive illustrated folders printed in English, French and German directed at specific industries which it is considered might be induced to establish works on Tyneside, have been issued. Tyneside has splendid sites for new works, factories, etc., with river, dock and railway facilities and unlimited supplies of cheap water, gas, electricity and chemicals and an abundance of labor both skilled and unskilled.

New Vessels in Sight

There has been of course many rumors and much talk of the prospective building of new ships as a direct consequence of the favorable provisions of the Jones-White act. It is too soon to expect any orders actually placed. However it is interesting to call attention to the definite statement of R. Stanley Dollar, vice president of the Dollar line that specifications and plans are under way for three improved passenger liners and that bids for their construction were to be requested.

Mr. Dollar pointed out that the new vessels would be faster and larger than those of the present fleet. It is also proposed to carry airplanes

for quick trips into the interior. It was suggested that the new ships would be of 22 knots speed which is five knots faster than the present vessels. Also the new vessels will be around 100 feet longer than the vessels of the present fleet.

Study Fuel Engineering

The University of Pennsylvania in the department of mechanical engineering of the Towne Scientific school began last year a course in fuel engineering. In a notice received from Robert H. Fernald, director of the department of mechanical engineering, announcement is made of the continuation of this course for a second year. The importance of such studies when applied to the marine field cannot be over-emphasized. A better understanding of the economical burning of fuel will help to reduce operating costs materially.

Honor Shipyard Official

Worcester Polytechnic institute at its fifty-eighth annual commencement and on the fortieth anniversary of his graduation awarded the honorary degree of doctor of engineering to Charles F. Bailey, engineering director at the Newport News Shipbuilding and Dry Dock Co.

The citation by Rear Admiral Ralph Earl U.S.N. retired, president of the institute summed up Mr. Bailey's achievements as follows:

"Charles Franklin Bailey, graduate in 1888, mechanical engineer, naval expert, designer and builder of ships, moving genius of a great shipbuilding and dry dock company, organizer of the human element in this great company, engineer of personnel, consulting engineer of a famous electrical corporation, interested and active in matters educational, civic, human, a loyal son and trustee of his alma mater."

Completes Long Tow

The SUSAN A. MORAN of the Moran Towing and Transportation Co. Inc., New York, arrived at Cartagena, Colombia with three deck barges in tow on July 3, completing its second and last delivery to that port until fall.

In connection with the open water race from the United States to Spain for schooner yachts, the Moran company handled the MOHAWK, ATLANTIC and GUINEVERE.

Bunker Oil Contracts at Low Prices

The bid of the Gulf Refining Co., Pittsburgh, to supply the bunker oil requirements of the Merchant Fleet Corp. at the ports of New York, Philadelphia, New Orleans, Galveston and Port Arthur for the three-year period commencing Jan. 1, 1929, was accepted by the shipping board July 10. All other bids were rejected and the Fleet corporation was authorized to reinvite bids for supplying requirements at Charleston, Savannah, Jacksonville, Tampa and Boston.

The contract is for the period of one year commencing Jan. 1, 1929, and shall be continued thereafter for two additional periods of one year each, provided only that nothing contained in the contract shall bind the Fleet corporation in any fiscal year for the future payment of money in excess of appropriations made by congress for the purpose of operating vessels under its control.

The contract with the Gulf Refining Co. will be made on the following basis:

New York and Philadelphia for the three-year period, an average price of 92 cents per barrel, terminal delivery, 97 cents per barrel, barge delivery.

New Orleans for the three-year period, an average fixed price of 86 cents per barrel, terminal delivery, and 91 cents per barrel, barge delivery.

Galveston for the three-year period, an average fixed price of 89 cents per barrel, terminal delivery, and 94 cents per barrel, barge delivery.

Port Arthur for the three-year period, an average fixed price of 84.33 cents per barrel, terminal delivery, and 89.33 cents per barrel, barge delivery.

The Fleet corporation was also authorized to close with the Gulf Refining Co. for its cargo requirements, which cover oil for its own bunkering stations, at a price of 79.33 cents per barrel, at Port Arthur.

All of these bids were accepted upon the basis of Fleet corporation requirements up to the maximum amounts specified by the bidder with the understanding that the corporation is not obliged to take any minimum quantity. The maximum estimated requirements are about 785,000 monthly.

Elmer H. Schumacher, secretary-treasurer of the New London Ship and Engine Co. New London, Conn. died July 10 at his home at Eastern Point, Groton, Conn. Mr. Schumacher served with the company 13 years.

Up and Down the Great Lakes

Lakes-to-Gulf and St. Lawrence Waterways—New Self Unloader—Lake Levels—Shipyard Work—Pig Iron Shipments

AN OPEN forum was held recently by the Chicago Traffic club for the discussion of terminal facilities for both the proposed Lakes-to-Gulf and St. Lawrence water routes. It was pointed out by Thomas C. Powell, president of the Chicago & Eastern Illinois railroad, that unless the country's navigation laws are amended, much of the present lake tonnage might be diverted to foreign ships when the direct lake-ocean waterways are completed.

It was stated that grain now moving from Duluth or Chicago to Buffalo for trans-shipment by rail to Europe by way of New York or Montreal is intercoastal traffic and under existing laws is reserved for American-owned ships. Grain moving direct to foreign ports, however, becomes international trade and thus is open to competition of foreign ships, Mr. Powell pointed out. He ventured the opinion that considerable lake tonnage was sure to be diverted to foreign ships unless present navigation laws are amended. It was stated that even now certain interests are considering the operation of foreign-flag ships in a regular line from Great Lakes ports, through the present canals, if sufficient regular cargo can be assured.

Maj. R. W. Putnam, engineer, who has prepared plans for Chicago harbor development, said the Lake-to-Gulf waterway probably will be in operation by 1933. Private interests, with terminals on the waterway, and others which have been making a study of its possibilities relative to their industries, make it appear certain that enough initial traffic will be available to give the waterway a good trade at the start, Major Putnam said.

Canadian Self-Unloader

Another Canadian self unloader, the steamer COALHAVEN arrived at Montreal during July. She is the latest addition to the Canada Steamship Lines fleet and at once commenced service in the Lake Erie and Lake Ontario coal trade through the Welland canal. She is a canal sized steel steamer especially fitted for the coal trade and she will carry about 2100 tons on a 14-foot draft. Her

principal dimensions are: length, 250 feet breadth molded, 43 feet; and depth molded, 25 feet. This vessel is able to discharge coal to the dock with her own machinery at the rate of between 350 and 400 tons per hour.

June Lake Levels

The United States Lake survey reports the monthly mean stages of the Great Lakes for the month of June as follows:

Lakes	Feet above mean sea level
Superior	602.47
Michigan-Huron	580.12
St. Clair	575.16
Erie	572.39
Ontario	246.59

Lake Superior was 0.31-foot higher than in May and it was 0.21-foot higher than the June stage of a year ago. Lakes Michigan-Huron were 0.19-foot higher than in May and they were 0.68-foot higher than the June stage of a year ago, and 0.02-foot above the average stage of June of the last ten years. Lake Erie was 0.32-foot higher than in May and it was 0.19-foot higher than the June stage of a year ago. Lake Ontario was 0.02-foot lower than in May and it was 0.48-foot higher than the June stage of a year ago, and 0.40-foot above the average stage of June of the last ten years.

Work at Manitowoc Yard

About the middle of July the Manitowoc Shipbuilding Corp., Manitowoc, Wis., had nearly completed the work under contract. Some of the work under way at that time and recently completed included several large repair jobs, among which were the THEODORE ROOSEVELT with bow damage, the steamer L. E. GEER, with bottom damage and also considerable repairs on carferries.

Work on the CHARLES M. WARNER now renamed the MICHIGAN which is being rebuilt for the Great Lakes Dredge & Dock Co. as a sand boat, it is expected will be completed early in August. The new diesel tug which was built for the same company was scheduled for delivery in the latter part of July. Another vessel the FRANCIS L. ROBBINS which is being rebuilt for the Newaygo Tug line will be completed early in August. The work on this vessel in-

cluded the installation of 'tween decks, cargo ports, gangway doors, paper and freight elevators and also miscellaneous work.

At the time of this writing the yard had no new contracts although bids were out on several projects.

Shipment of Pig Iron

The drop of 50 cents in the base price of pig iron at Chicago to \$17.50 on July 10 is believed to have erected a formidable barrier against the shipment of pig iron from New York and Ohio lake furnaces to the Chicago district by boat for the remainder of this season. Some possibility is seen that the price at Chicago will permit the movement at a profit of iron of the higher silicon grades by boat despite the competitive market in Chicago, but it will be difficult to ship the base grades from eastern lake furnaces to Chicago under present market conditions.

Shipment of finished steel by boat continues active this season on the Great Lakes. The usual amount of shipments from the Chicago district steel mills to Canadian ports is reported, while indications are that the season will show a gain in shipments from Buffalo to Chicago and Milwaukee by boat. One of the lower lake steel mills is maintaining regular schedules for the movement of steel westward on the Great Lakes.

Converts Large Barge

The Great Lakes Towing Co. has bought from the Pittsburgh Steamship Co. the barge, MANDA, and this vessel will be converted to a lighter. The work will be done by the Great Lakes Towing Co.'s own plant on the Cuyahoga river, Cleveland. It is expected that the work will be completed by the end of the season. She was built in 1896 and has a carrying capacity of about 6000 tons. Her length is 352 feet on the keel with a beam of 44 feet and a depth of 26 feet. It is in this way that slowly but surely the smaller, older cargo vessels are being absorbed in other trades and eliminated from the lists of the larger companies to be replaced it is hoped by new and larger up-to-date vessels.

Award Welding Prizes

In 1927 the American Society of Mechanical Engineers accepted the custody of \$17,500 offered by the Lincoln Electric Co., Cleveland, to be awarded in a competition for the best three papers on the advancement of electric arc welding. Three prizes were to be awarded—\$10,000 for first place; \$5000 for second; and \$2500 for third.

In all, 77 papers were submitted from the United States and foreign countries, and this number was reduced to 11 on which the final vote was taken. By unanimous decision, first place was given to James W. Owens, supervisor of welding, Newport News Shipbuilding & Dry Dock Co., Newport News, Va., for a contribution, "Arc Welding—Its Fundamentals and Economics."

Second place went to Prof. Henri Dustin, University of Brussels, Brus-

sels, Belgium, for a paper, "Fundamental Principles of Arc Welding;" and third place to Commander H. E. Rossell, instructor of mathematics at the United States Naval Academy, Annapolis, Md., for his paper, "Electric Welding of Ships' Bulkheads and Similar Structures."

S. S. President Warfield Trials Successful

The new steamer, PRESIDENT WARFIELD built by Pusey & Jones Shipbuilding Corp., Wilmington, Del., for the Baltimore Steam Packet Co., gave some interesting results on trials held July 12. This vessel is similar in size and arrangement to the sister ships, STATE OF VIRGINIA and STATE OF MARYLAND, and is designed along the same lines. Propelling machinery consists of one triple expansion steam engine of four cylin-

ders, 24½ x 40 x 47 x 47 inches in diameter and 42-inch stroke. The characteristics of the propeller are: diameter 12 feet 6 inches; pitch, 18 feet 6 inches; developed area of propeller, 69.8 square feet; projected area of propeller, 52.6 square feet; number of blades, 4. The propeller is made of manganese bronze in one solid casting and is right hand. On the trials July 12, in deep water the draft forward was 9 feet 6 inches and the draft aft 15 feet 4 inches, giving a mean draft of 12 feet 5 inches. The displacement was 2350 tons.

During the trials of July 12, from Christiana river to Lewes; from Lewes to Cape Charles; from Cape Charles to Old Point Comfort; Old Point Comfort to Baltimore, the total distance covered was 374 nautical miles and the total sailing time was 22 hours. Consequently the mean speed equaled 17 knots or 19.57 statute miles per hour.

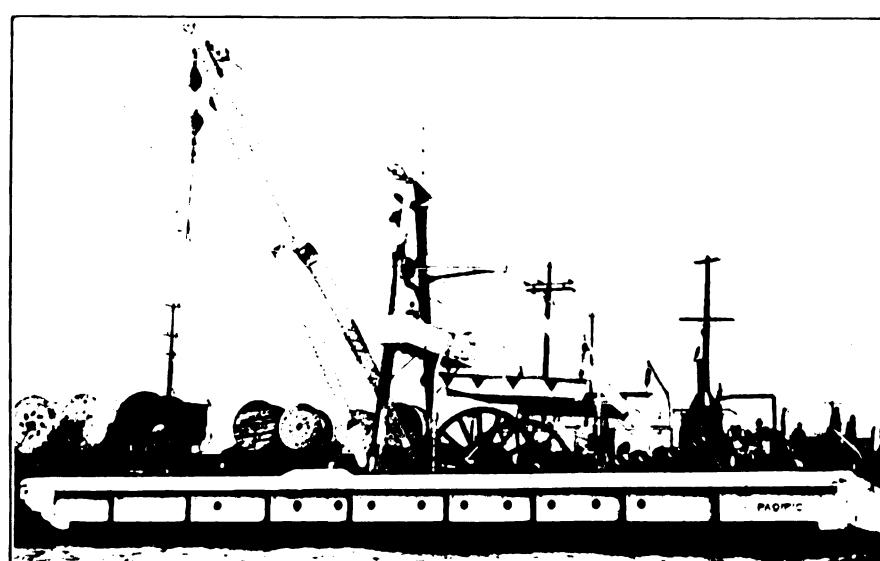
It was noticeable that the new ship made the same speed of 18.5 miles per hour as the STATE OF VIRGINIA but requiring something like 900 horsepower less to do so, or putting it another way the speed of the PRESIDENT WARFIELD for the same output of power has been increased from 18.5, the accepted speed of the sister ships, STATE OF VIRGINIA and STATE OF MARYLAND, to 19.75 miles per hour. It was also noticed that the running of the propeller was much quieter and that there was a decrease of vibration in the stern of the ship. Much of this good result on the PRESIDENT WARFIELD is claimed for the Oertz streamline rudder which has been fitted. Referring to the saving of about 30 per cent in horsepower it is claimed that 20 per cent is due to the influence of the streamline rudder; that 2 per cent is due to the omission of bilge keels and that 8 per cent is due to a cast bronze propeller with smaller hub.

Build Channel Steel Barge

THREE large barges have recently been built under the Ellis channel system of steel hull construction on the Pacific coast. The largest, costing approximately \$100,000, is the cable barge PACIFIC, illustrated below, of the Pacific Telephone & Telegraph Co. of San Francisco. This barge will be used in laying, maintaining and repairing submarine telephone and telegraph cables in San Francisco harbor and elsewhere on the Pacific coast. The other two barges are for the Kamchatka company, a Soviet government organization, and will be used as fish carriers in Siberia, having been shipped to their destination in sections. Due

to the strength and simplicity of the channel method of construction shipping of hulls for export is an easy matter.

The Pacific Telephone and Telegraph Co. barge, measuring 100 feet by 40 feet by 12 feet, is built entirely of 12-inch structural channel steel, riveted edge to edge. This barge has been equipped with a 25-ton derrick, and a cable reel which will hold 15,000 feet of four-inch cable, both of which are driven by steam. There is an electric light plant and an electric arc welding plant aboard; also commodious accommodations for from 35 to 40 men, including galley and mess room.



CHANNEL STEEL CABLE BARGE PACIFIC FOR PACIFIC TELEPHONE & TELEGRAPH CO.

Fuel Used Cut Down

Attention of engineers who are concerned with fuel economy in ships may well be directed with profit to the performance of the new Canadian Pacific cabin liner, DUCHESS OF BEDFORD. John Johnson, superintending engineer of the line, states that this vessel burns 0.60 of oil per shaft horsepower for propelling machinery and 0.64 pound per shaft horsepower for all purposes. This was the result obtained during the trials and Mr. Johnson expects a further reduction during service of the vessel.

Personal Sketches of Marine Men

William H. Gerhauser, Elected President of American Ship Building Co.

By E. C. Powers



Blank-Stoller Inc.

ONLY 39 years of age, William H. Gerhauser, elected president of the American Ship Building Co. at a meeting of the board of directors in Cleveland on June 27, is one of the youngest men in the country to become head of an organization of such great significance and strength as this largest shipbuilding company on the Great Lakes.

The American Ship Building Co. which Mr. Gerhauser has served in various executive capacities since 1917, maintains six subsidiary operating companies including facilities in Cleveland, Lorain, O., Buffalo, South Chicago, Ill., Detroit, Superior, Wis., and Milwaukee. With assets of more than 25 million dollars this company has, during the period of its existence, done more in the way of iron ore vessel construction than any other yard.

Mr. Gerhauser who succeeds the company's late president Alfred G. Smith, one of the most outstanding figures in Lakes shipbuilding circles in recent years, was born in Detroit, Jan. 7, 1889. His elementary training was received in the public schools of Detroit and continued later at the Detroit University school, where his studies prepared him for entrance to the University of Michigan. Specializing throughout his course in technical and scientific subjects he was graduated in 1911 a bachelor of chemical engineering.

He became active in executive positions very soon after graduation, the first position being that of assistant secretary of the Detroit board of commerce. Following this, he became associated with the Williams Bros. Co., Detroit, remaining there until 1916 meanwhile serving as assistant and finally as superintendent.

Leaving Williams Bros. Co., in 1916 he organized W. H. Gerhauser & Co., acting as president until 1917 when

WILLIAM H. GERHAUSER has been elected to fill the office of chief executive of the largest shipbuilding company on the Great Lakes after the comparatively brief period of eleven years' service.

HIS advance has been consistently steady since he first became associated with the company due to the fact that he could be depended upon to get any situation thoroughly in hand without delay.

NO CHOICE could have been met with so universal and hearty approval on the part of his co-workers. To a man they respect him for his ability and like him for his straight forward fairness.

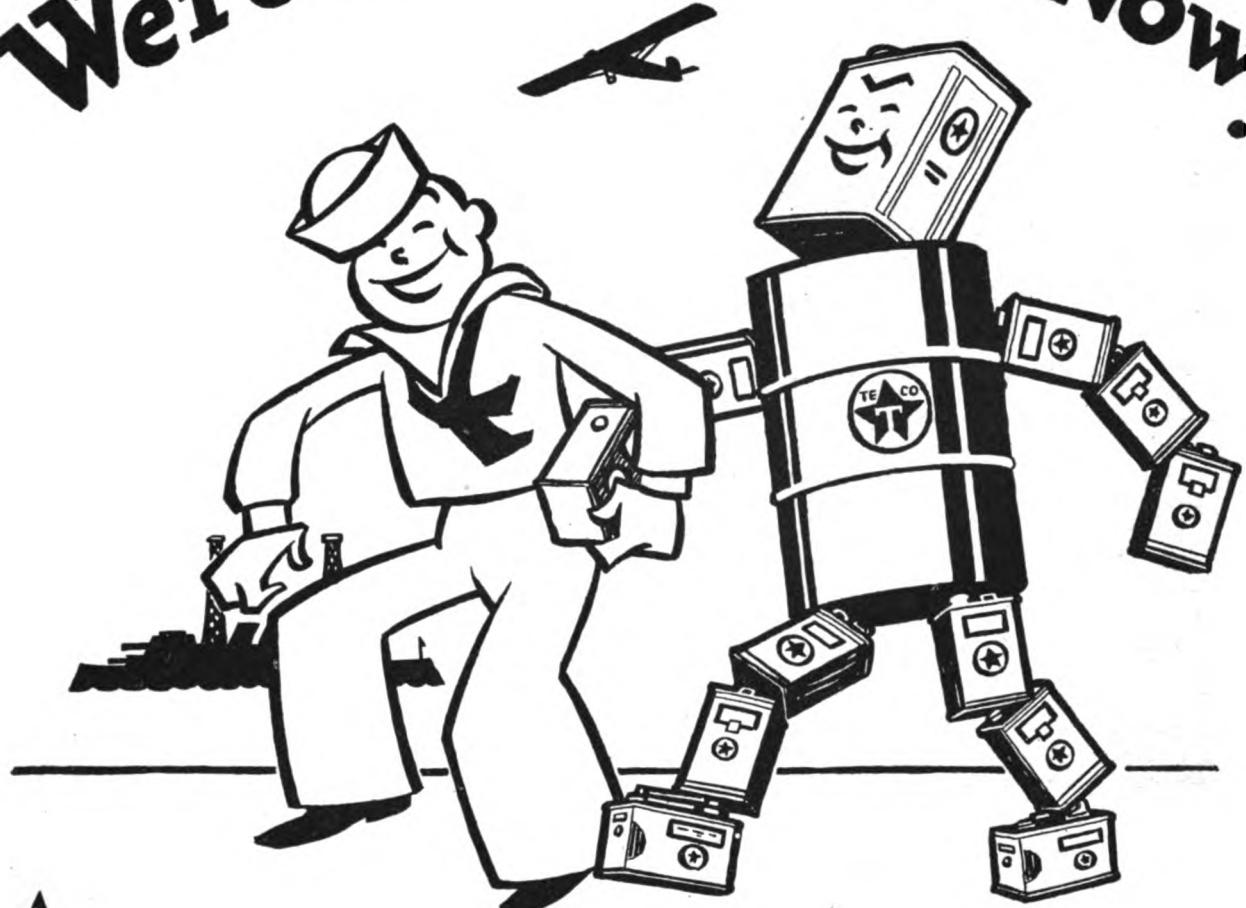
his association with the American Ship Building Co. began with his appointment as assistant to M. E. Farr, his father-in-law, who was then president. These were active days for all shipyards. Never before had yards on the lakes been called upon for such tremendous efforts. Literally thousands of ships had to be built to meet the needs of the war, and in this program the American Ship Building Co. did its full share. During 1917 it is said that 20 per cent of the ships delivered to the United States shipping board were constructed in the yards of the American Ship Building Co. Within the year 1918, the company was building vessels for the government at the rate of 15 a month or an average of one every other day, intending to increase the number to 20 a month subject to the continuation of the war.

It was in 1918, during the company's intensive wartime shipbuilding program that Mr. Gerhauser was made vice president. In 1925 at the time of Mr. Smith's election to the presidency Mr. Gerhauser was in addition to being vice president called upon to serve as secretary.

Mr. Gerhauser enters upon the duties of his office well qualified for its requirements. Though young in years he is old in terms of service in executive positions being a fortunate combination of the driving power of youth and the sobering touch of experience. Throughout the many weeks of Mr. Smith's illness Mr. Gerhauser managed the company, performing the duties of the chief executive. Mr. Smith's abilities both as an executive and shipbuilder were equal to the combined capacities of two specialized individuals. It is this position which Mr. Gerhauser has been chosen to fill.

He is a member of Hermit and Pepper Pike Country clubs and lives in Orange village, near Cleveland.

We're in the Navy Now!



Announcement of the awards for the Navy Contract for Lubricating Oils has been made.

We didn't get it all. But we were awarded a large share of the items on the Atlantic and West Coasts—and all of the items for Oriental Ports.

It is a large contract. And it is important, too, in its reflection on the quality of our products, on our ability to deliver, and the completeness of the

line of Texaco Lubricants.

Our oils will be in use on all types of vessels from big Dreadnaughts to little "Chasers," from Seaplanes to Submarines; on Turbines, Corliss Engines, Diesel motors, Airplane engines; on Pumps, on Ice Machines, on Line Shafting and, in short, on all the intricate variations of machinery and equipment employed in the operation of this huge unit of our National Defense.

There is a TEXACO Lubricant for Every Purpose

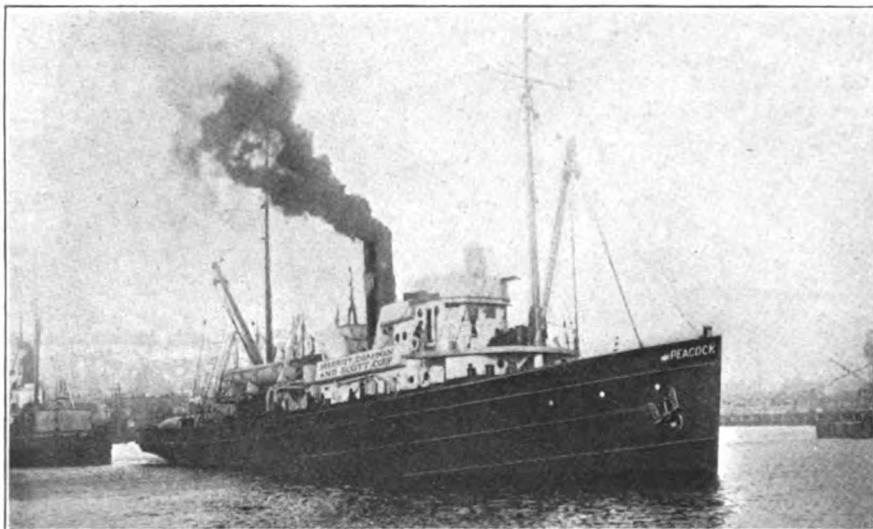
THE TEXAS COMPANY

Texaco Petroleum Products

17 Battery Place, New York City

OFFICES IN PRINCIPAL CITIES





Salvage Steamer Peacock Made Longest Rescue Voyage on Record

Longest Rescue Voyage

THE longest rescue voyage in maritime history has been brought to a successful conclusion by the Merritt-Chapman & Scott salvage steamer PEACOCK. This voyage, which involved a 17-day run of 4600 sea miles from her San Pedro, Calif., base to Nukulailai island in the South seas, below the equator, was undertaken by the PEACOCK to float the Isthmian line's stranded cargo steamer STEEL MAKER, which was driven on the jagged coral rocks of Nukulailai during a sudden tropical storm on March 26. She had on board at the time, 5000 tons of chrome ore and other cargo.

Nukulailai, which is sometimes called Mitchell island, is one of the Ellice group in the Central Pacific ocean, and lies in latitude 9 degrees 30 minutes south; longitude 180 degrees. The PEACOCK, a steam screw vessel of the navy mine-sweeper type, 741 tons gross, with engines of 1400 horsepower, made the trip in 17 days, stopping only six hours in Honolulu harbor to replenish fuel and take on stores.

When the PEACOCK arrived at the scene, the wreck was found to be lying on a coral reef in the open sea, in a location which afforded little or no protection from storms, heavy swells and strong currents. The STEEL MAKER'S keel was broken, her bilges crushed in, and the jagged rocks on which she rested had seriously damaged her bottom. So heavy was the sea that it was impossible for the divers to apply emergency patches, as usually is done; they

could do little more than to survey the condition of the hull and provide data for the salvage master's plans.

One thousand four hundred tons of cargo was jettisoned from No. 2 and No. 3 holds and five powerful gasoline salvage pumps, capable of handling 15,000 gallons of water a minute, were set up in one of the holds and worked to capacity. Twelve days and nights of this continued effort floated the STEEL MAKER and freed her from the strand. Then, with the five big pumps barely controlling the flow of water through the rents in the ship's bottom, the expedition on May 3 stood off for Pago Pago, Samoa, 750 miles away, the nearest safe harbor in which the divers and salvagers could proceed with the temporary repairs. This long tow was made in six days, arriving in Pago Pago May 9. Since then the salvage crew made temporary repairs to the hull and conditioned the STEEL MAKER'S engines so that on July 10, she set out on the long return voyage of 7800 sea miles to drydock in the United States, via the Panama canal. She is traveling under her own power and without convoy, the PEACOCK returning directly to her home station at San Pedro.

More than \$30,000 worth of fuel oil will have been consumed by the time the STEEL MAKER reaches New York and the PEACOCK her base in California.

The S. S. STEEL MAKER, built in the year 1920, is a steel cargo vessel of 6187 tons gross, 3821 tons net, and belongs to the Isthmian line, an

operating subsidiary of the United States Steel Corp.

Mail Contracts Signed

About the middle of July it was announced that four contracts for ocean mail service in accordance with the provisions of the merchant marine act of 1928 had been awarded by Postmaster General New. Among these awards are: the Munson Steamship line from New York to Buenos Aires; Grace Steamship Co. from New York to Valparaiso; New York and Porto Rico Steamship Co. from San Juan Porto Rico to Santo Domingo and the Export Steamship Corp. for service between New York and Mediterranean and Black Sea ports.

The contract with the Export Steamship Corp. provides for the building of new and faster tonnage during the operation of the contract. Plans and specifications of four fine new combination passenger and freight vessels for this service have already been approved and it is expected that bids will be received shortly. The actual signing of these mail contracts is the first direct practical effect of the Jones-White act and it will mean that in each instance the company receiving a contract will be in a better position to compete for cargo between the ports named.

Order Two New Colliers

The Berwind-White Coal Mining Co. has awarded a contract for two colliers to the Bethlehem Shipbuilding Corp. The vessels were designed by Theodore E. Ferris and will be constructed at the Fore River plant, Quincy, Mass., under his general supervision. It is said that they are to be fitted to burn pulverized coal and that the cost is \$1,757,000. They are to be delivered within fourteen months. The coal capacity of each will be 7000 tons.

Both vessels are to be single screw of the usual collier type with machinery aft. One however is to be fitted with scotch boilers and a reciprocating engine while the other is to have water tube boilers and geared turbines. The general dimensions of the vessels are: length over all, 366 feet, 6 inches; beam 50 feet; loaded draft 23 feet 6 inches. A speed of 10½ knots at sea is expected.

The airplane service from Cherbourg to Paris in conjunction with steamship travel from New York has proved popular with travelers, and the service will be extended to the HOMERIC, according to announcements.

S. S. CALIFORNIA

LARGEST American built liner is completed—a sister ship is now building in our yard.

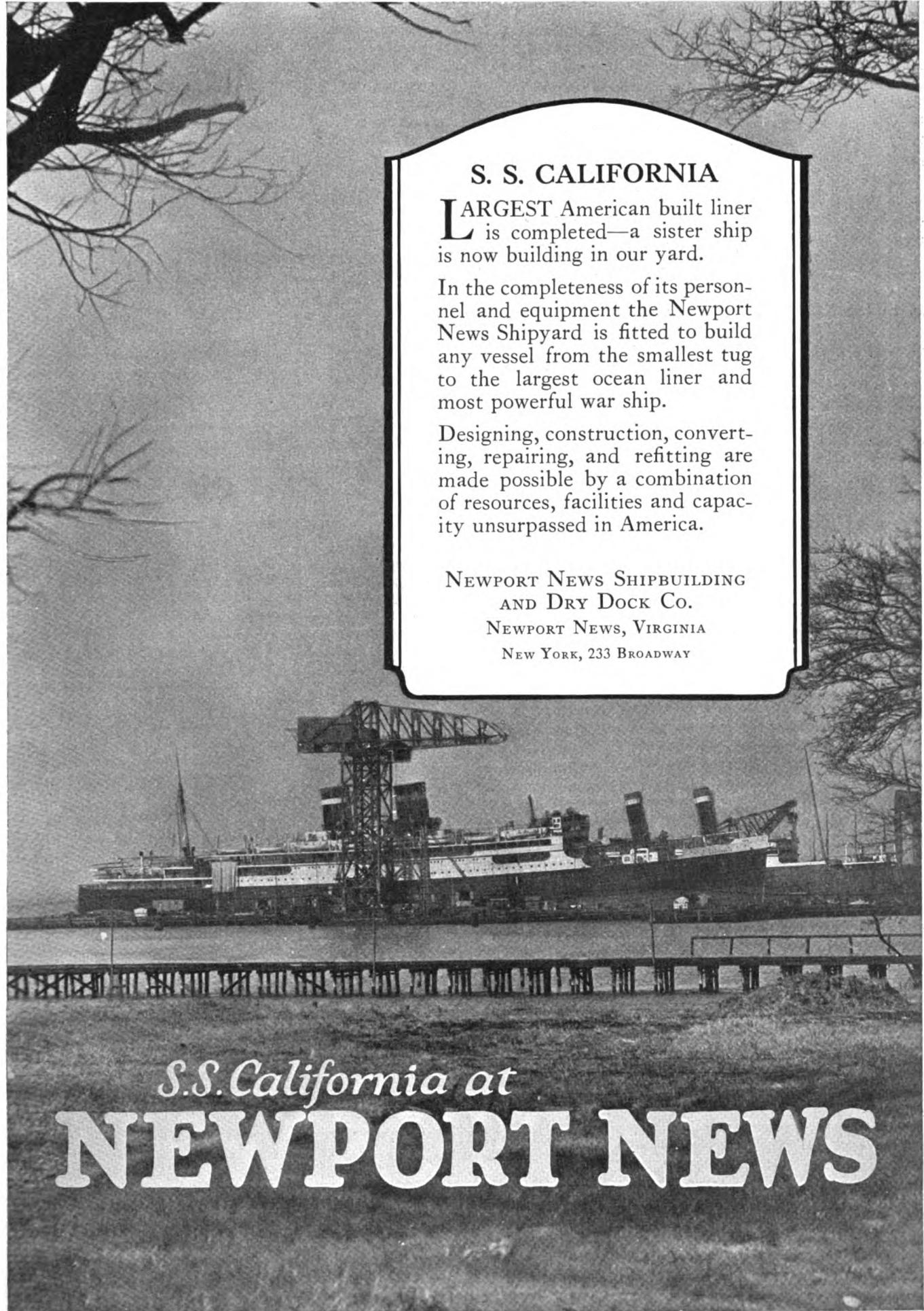
In the completeness of its personnel and equipment the Newport News Shipyard is fitted to build any vessel from the smallest tug to the largest ocean liner and most powerful war ship.

Designing, construction, converting, repairing, and refitting are made possible by a combination of resources, facilities and capacity unsurpassed in America.

NEWPORT NEWS SHIPBUILDING
AND DRY DOCK CO.

NEWPORT NEWS, VIRGINIA

NEW YORK, 233 BROADWAY



S.S. California at
NEWPORT NEWS

Sailing Foreign

(Continued from Page 30)

less in five years. After ten they are performing regularly and consistently. There is less mechanical vibration than I have experienced on a 20,000-ton ship of a well-known European line.

But this is no ordinary freighter. It is the private yacht of a party bound for Egypt and Palestine. No passenger liner afloat could furnish us the satisfactions of this American merchantman. The lounge has been a class room and lecture room as well as tea room, game room, etc., without interruption to ourselves or annoyance to others. The passenger capacity is twelve. The cuisine is excellent, the cabins newly appointed and capacious. The passenger decks are attractively shaded with awnings for the Mediterranean sun, while 27 canaries taken on by the crew at Malta make music that surpasses the radio concerts from Spain, France, England, Germany, and Italy. The genial fellowship of the table with the ship's officers adds the intimate touch of the life of the sea. There is no contest for "favorable locations" for deck-chairs; there are plenty for all—"the whole ship is yours!" The crew, busy with their tasks are courteous and always interesting. Their accordians and mandolins add romance to the moonlight nights.

Down below are Packards and Chevrolets, Willys-Knights and Studebakers, for the American motor car is supreme in Mediterranean lands. There is flour from Minneapolis and farm machinery from Racine, chewing gum from Chicago, balloon and truck tires from Akron, dried prunes from California, gingerale from Waukesha, movie films from Hollywood, and hosiery from Milwaukee. Prosperity for the American farmer and manufacturer presupposes foreign markets more than ever before. The Mediterranean countries are strategically open to American trade. It is no longer a question whether American shipping lines can open new markets; they are doing it. In 1821 88.7 per cent of American exports and imports were carried in American vessels. In 1924 it was 9.7 per cent. Today it is approximately 24 per cent.

At Malta the morning we left, there were in the harbor three British battleships, a fleet of destroyers, a hospital ship and auxiliaries of every description, and what we were told was their latest submarine, the X-1. If Britain wants her dreadnaughts and naval supremacy let her

have them. We have no quarrel with England. Her taxes swell the ranks of her unemployed, and unemployment means national loss. If her territorial possessions require an overbalanced navy, well and good. But while her fleet was steaming up in splendid array because of the news of unrest in Egypt, the great guns gleaming and the crews on deck in precise formation, the little 9500-ton tramp from Hog Island slipped quietly out of the harbor on her way to Alexandria doing more for her country than the threatening gesture of an entire fleet.

We don't need to rebuild Hog Island, but her ships—as all ships do—will need replacing. We blithely swallow a camel with a quarter-billion dollar appropriation for battleships, and strain at a gnat with a few million for the friendly constructive service of a modest merchant marine.

Port Newark Is Growing as Ocean Terminal

Dock space at the Port of Newark is being increased as fast as contractors can build, and the carrying out of plans for another ship basin and piers await government dredging of new anchorage grounds and widening of the channel in Newark bay to permit these improvements to be built on deep water frontage.

Ship-to-car and car-to-ship loading and unloading at the Newark port is the magnet which is luring business to this terminal. So advantageous and economical have shippers found this arrangement, that already Newark has secured a large proportion of the receipts of Pacific coast lumber destined for points in the vicinity of New York. In May the total receipts of lumber and other tonnage from the Pacific coast at the Port of Newark amounted to 140,651 tons as against 351,626 tons received at New York docks while the clearance of general freight from Newark for Pacific coast points was 11,863 tons as compared with 298,301 tons from the port of New York.

With an intercoastal business which is now 40 per cent of that of the port of New York, and a coastwise business amounting to about 15 per cent of that of the older port, Newark is planning to make provision for double this amount of business within the next year.

Peter J. O'Toole, supervisor of the Newark port, announced this week that more ships docked at Newark in June of this year than in the entire twelve months of 1922, the first year the city docks were in use. June busi-

ness at the port comprised 23 sailings and 39 arrivals. It is estimated that 500,000,000 feet of lumber will be unloaded at the Port of Newark this year. Last year's lumber receipts were 327,000,000 feet.

During June, more than 100,000 tons of general cargo were loaded or unloaded at the Port of Newark, in addition to lumber receipts and shipments. There were 12,000 freight cars loaded or unloaded at the port during the month, 6000 motor truck loads of freight handled, and 30 lighters and barges arrived and cleared.

Board Appointed

A board of five engineers has been appointed by the navy department under authority of congress, to consider and to pass on something like 4000 ideas presented to the navy following the S-4 catastrophe. Those who have been appointed to serve on this board are Rear Admirals David W. Taylor and Joseph Strauss, retired, Dr. W. R. Whitney, director of research, General Electric Co. and Thomas A. Scott of the Merritt Chapman & Scott Corp. The fifth member was to be John F. Stephens, engineer of New York, but he was unable to serve.

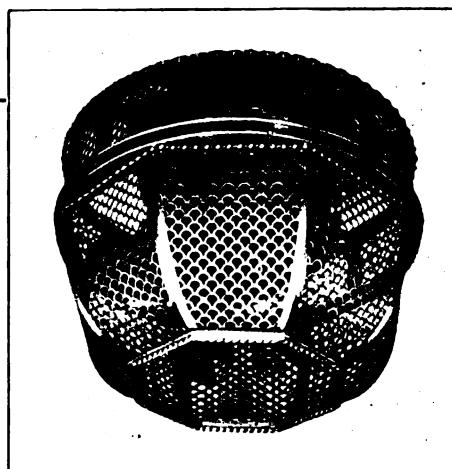
Ask for Mail Bids

The postmaster general has advertised for bids on 15 ocean mail routes. Bids for these services must be in for the Atlantic and Gulf coasts on Aug. 10 and for the Pacific coast by Aug. 20.

These routes include the service from Boston to Yarmouth; from New York to Copenhagen and Helsingfors; from New York to ports on the West African coast between Casablanca and Cape Town; from New York to Maracaibo; from New York to Port-au-Prince Kingston and Cartagena to Puerto Columbia; from New York to Havana; from New York to Vera Cruz; from New Orleans to Progreso; from Galveston or Port Arthur via Port-au-Prince to Santo Domingo; from San Francisco to Sydney; from San Francisco to Manila via Japanese and Chinese ports; from Seattle to Manila via Japanese and Chinese ports; from San Francisco to Colombo; from Portland, Oreg. to Manila via Japanese and Chinese ports; from Portland, Oreg., to Dariam.

Bids are to be accepted at the office of W. Irving Glover, second assistant postmaster general until noon, Aug. 10, for routes on the Atlantic and Aug. 20 for the Pacific.

The GYROCONE



Ceiling Fan of Distinction!

Especially designed for dining rooms, ball rooms, large cabins, etc., and wherever air circulation without direct draft, quietness of operation, and attractiveness of appearance are essential factors.

Enclosed entirely in a substantial, grilled copper guard of dignified and graceful design, the Gyrocone ceiling fan resembles a dome light when installed, and is a welcome addition to the general scheme of decoration.

It operates under a new and unique principle which produces efficient distribution of air with unusual smoothness of operation. Mounted in a ball bearing pivoted cradle, a sturdy twelve inch, four blade oscillating fan gyrates in a complete circle at an angle of 27 degrees from



vertical, providing a total sweep of air of 54 degrees without sustained breeze in any one direction. Operating parts are enclosed in dust proof housings and all moving parts are ball bearing equipped. Lubrication reservoirs are sufficiently large to insure continuous operation, under normal conditions, over a period of two years.

Obtainable for either ceiling or stem mounting, in a variety of frame designs and colors which will match almost any style of decoration.

DIEHL MANUFACTURING COMPANY
ELECTRICAL DIVISION OF THE SINGER MANUFACTURING COMPANY
ELIZABETHPORT, N. J.

Ford Scrapped Ships

(Continued from Page 24)

The common hazards of the sea must be reckoned with. The additional difficulties presented by towing must be considered, for shipping men regard towing as one of the most difficult of all sea operations.

Navigation laws peculiar to the situation must be studied. Enroute to Fordson the ships would pass through foreign waters and dock at foreign ports; this would add complications to the task. Every potential cause for delay must be minimized. Arrangements must be made for coaling tugs and steamers, for shipping crews, for provisioning the boats. Men must be stationed at strategic points to facilitate the ship movement in every way possible.

The route itself must be mastered. This problem alone was great, for the way from the East coast to the Great Lakes is admittedly difficult. As far north as Portland the Atlantic coast offers harbors in which a vessel may seek shelter during heavy weather, but above there the refuge points are few and their qualities largely negative. And refuge points are important to a tug or steamer which has two boats in tow.

From Maine to the Gulf of St. Lawrence is a region noted for its fogs and storms and dangerous rocks. Once in the St. Lawrence river dangers of this kind are past, but difficulties of a new order are encountered. To Montreal the going is comparatively simple, but above Montreal are the St. Lawrence river canals.

Canalling is an art in itself. Towing ocean-size ships through seven canals with 22 locks requires skill of highest order. But that was not all. Across Lake Ontario was the Welland canal, 26½ miles long, with 25 locks and a rise of 326½ feet. And then came Lake Erie, notorious for its treacherous squalls. Without question, getting the ships to Fordson would be a job of first magnitude.

Seven seagoing steel tugs, the BALLCAMP, BARLOW, BAYMEAD, BARRALLTON, BATHALUM, BUTTERCUP and HUMERICK, were purchased from the shipping board at a cost of \$42,500 each—sturdy craft, built by the government in 1918 and 1919. They were 142 feet long, 27.7 feet wide, with an extreme draft of 16 feet. They were coal burners, and each had a triple expansion steam engine with cylinders 17 x 25 x 43 inches in bore and 30 inches in stroke. Repairs to the tugs averaged another \$12,300 apiece.

In addition it was decided to re-

condition three boats of the 1020 class to aid in the towing. The LAKE BENROW, the LAKE ORMOC and the LAKE GORIN were chosen. All were at New Orleans; thus an unnecessary dead-head trip was saved at the outset in moving the ships northward. Re-conditioning meant drydocking the vessels and complete overhauling for their hulls and machinery and equipment. This ran into additional thousands.

The problems of navigation, however, were not the only ones to be considered in preparing for the job. Tests of the ship steel were made at Fordson. Lists of available ship equipment were compiled, and supplied to department heads and managers of company branches in all parts of the world. A program for the dismantling operation at Fordson was laid out. Plans for a new dock were prepared. Designs for special tools were drawn.

But plans and preparations were of little value without actual first-hand knowledge. Experimental work on one of the boats at Fordson was essential. The ship could be taken apart bit by bit, its construction details studied, its metals analyzed. Workmen could be trained. New processes devised, new machines built.

Winter was close at hand. Negotiations with the shipping board and necessary preliminary surveys had taken time. The great movement of ships could not start until the spring of 1926. One ship, though, must be gotten through.

The distinction fell to the LAKE FONDULAC, a vessel built in Chicago in 1918. It had not seen transatlantic service; instead it had plied between American ports and the West Indies. But its last trip was to be memorable. Ice was already forming in the North Atlantic and the St. Lawrence. Winter storms were sending vessels scurrying for shelter. Shipping men doubted whether the trip was possible. Nevertheless on a bleak day in mid November the FONDULAC left Kearny in tow of the tug, BALLCAMP. Thirty-three days later it docked at Fordson.

In the next installment will be related the hazards encountered by the tug BALLCAMP in towing the LAKE FONDULAC from Kearny, N. J., to Fordson, and the mechanical setup for cutting down the ships at Fordson and at North Atlantic shipyards.

Gage Company Sold

Manning, Maxwell and Moore Inc. has purchased the business of the American Schaeffer and Budenberg corp., and it will merge that business

with the business of its subsidiary company, Consolidated Ashcroft Hancock Co. Inc.

Consolidated Ashcroft Hancock Co. Inc., which is owned exclusively by Manning, Maxwell and Moore Inc., is the operating company handling the manufacture and sales of its steam specialties business. This includes the well known lines of Ashcroft gages, consolidated safety valves, Hancock valves, inspirators, etc. The complete American Schaeffer and Budenberg line, including gages, safety valves, thermometers and recording instruments for a wide range of service, will be manufactured and sold in conjunction with Consolidated Ashcroft Hancock products.

Engineering Congress

Shipbuilding and marine engineering are listed among the subjects which will be taken up by the World Engineering congress, to convene at Tokio in October of next year, according to the technical program received from Japan by Dr. Elmer A. Sperry, chairman of the American committee arranging for the participation of American engineers in the event.

The topics scheduled for discussion by engineers of international repute are listed under twenty-three separate headings and include virtually every branch of industrial engineering and scientific development. It is expected that much interest will develop in marine engineering and shipbuilding because of the progress Japan has made along these lines. Baron Shiba, vice president of the World congress and professor of marine engineering at the Imperial University of Tokio, is considered one of the world's foremost marine engineers.

The scope of these subjects of particular interest to marine engineers will include, according to the outline forwarded Dr. Sperry, theoretical naval architecture, construction of ships, governmental and classification society's regulation rules for shipbuilding and marine engineering, main and auxiliary machinery, equipments of shipbuilding yards, ship equipments and life-saving appliances.

In connection with this phase of the program it is expected visiting American shipbuilders and engineers will take the opportunity to inspect the two new Nippon Yusha Kaisha steamers Japan is putting into service next year. They are said to combine the best features of modern marine engineering, the result of study by Japanese engineers of the world's greatest ocean liners.